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Vegetable Situation

Economics, Statistics, and Cooperatives Service

U.S. Department of Agriculture

TVS-215

FEBRUARY 1980

Approved by the World Food and Agricultural Outlook and Situation Board

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THE VEGETABLE SITUATION

CONTENTS

	Page
Summary	3
Recent Developments and Outlook	4
Fresh Vegetables	4
Processed Vegetables	7
Potatoes	10
Sweet potatoes	11
Mushrooms	11
Dry Edible Beans	13
Dry Edible Peas	14
Special Article:	
Status of Harvest: Mechanization Of Vegetable Crops in the United States	29
List of Tables	28

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SUMMARY

Vegetable Prices Down

So far this year, generally warm weather and favorable growing conditions have helped produce large supplies of fresh winter vegetables resulting in lower prices. The index of farm prices for fresh market vegetables in December stood at 199 (1967=100), 6 percent below both a month and a year earlier. Because of the large supplies from 1979's bountiful harvests average retail prices for canned and frozen vegetables have remained near year-earlier levels and are expected to continue so the first half of 1980.

The 1980 acreage of 13 fresh winter vegetables is 10 percent larger than a year ago. Assuming average yields, this will result in a 7-percent increase in total output. Increased production is expected for snap beans, broccoli, cabbage, carrots, eggplant, lettuce, spinach, and tomatoes. Production of cauliflower, celery, sweet corn, escarole/endive and green peppers is expected to decline.

Grower prices for fresh market vegetables are expected to rise seasonally above the December 1979 level. Nevertheless, barring frost damage, average grower and retail prices in the first quarter of 1980 are likely to be 5 to 10 percent lower than a year earlier.

Packs of canned vegetables were substantially larger in 1979 than a year earlier. The frozen vegetable industry also reported larger packs, although stocks of frozen vegetables on January 1, 1980—at 1.9 billion pounds—were only 4 percent larger than a year earlier. The total 1979 supply of processed vegetables—canned and frozen—was near-record large, and supplies of canned tomatoes and green peas were well above market needs.

The ESCS index of wholesale prices for canned vegetables in January 1980 averaged 191.5 (1967=100) 3 percent more than a year ago. Because most canned vegetables are in large supply, prices are expected to remain near last year's levels until the new pack gets underway next summer.

In view of present large supplies, little upward price movement is expected for frozen products. Prices may edge slightly higher because of

increased processing and marketing costs. With ample supplies and slower-than-normal movement, smaller plantings of most processing vegetable crops are expected next year.

Fall potato production declined to 301.6 million cwt. in 1979, 7 percent below the 1978 crop and 2 percent below the 1977 fall total. Potato production was down 8 percent from a year earlier in the nine western States, and down 10 percent in the eight Midwestern States. In the seven eastern States, production was 5 percent above a year ago.

In January, 183 million cwt. of potatoes remained to be sold, 7 percent less than at the same time a year ago. U.S. grower prices for potatoes this season are averaging higher than in 1978/79, when a USDA diversion program was in effect. The December 1979 price to growers averaged 3.40 cents per cwt., compared with 3.02 a year earlier.

With the largest sweetpotato production in years, 1979 grower prices were substantially lower than a year earlier. However, because of the larger carryover of 2.2 million cases on July 1, 229 percent more than a year earlier—canners produced only 4 percent more canned sweet potatoes.

In 1979, the mushroom industry experienced rapid growth as more production capacity was added. Despite increased supplies, continued good demand kept prices for fresh and processed mushrooms at year-earlier levels—68-70 cents a pound for fresh and 62-64 cents for processed.

U.S. production of dry edible beans in 1979 rose to a record 20.7 million cwt., up 9 percent from the 1978 level. Prices for most classes of beans have been above year-earlier levels, however, because of strong export demand.

RECENT DEVELOPMENTS AND OUTLOOK

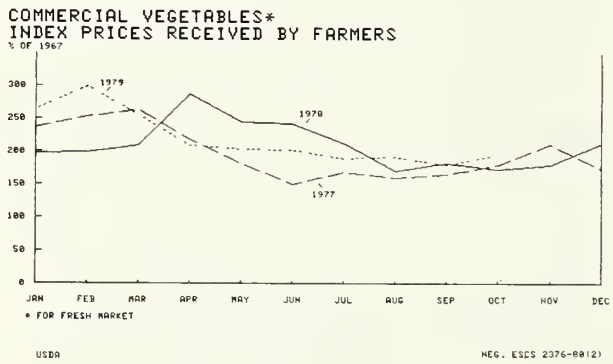
FRESH VEGETABLES

The 1980 acreage of 13 fresh winter vegetables is 10 percent larger than a year ago. Increased production is expected for snapbeans, broccoli, cabbage, carrots, eggplant, lettuce, spinach, and tomatoes. Production of cauliflower, celery, sweet corn, escarole/endive and green peppers is expected to decline. Assuming average yields, total output could be 7 percent larger than a year ago.

So far this season, imports of tender vegetables have been below year-earlier levels. Market news reported that from August through December 1979, 406,000 cwt. of tomatoes, excluding cherry tomatoes entered the United States compared with 619,000 cwt. in the year-earlier period. Imports of cucumbers rose from 537,000 to 594,000 cwt between the two periods. Import activity is expected to increase seasonally in late January and early February.

In 1979, the index of average grower prices for fresh vegetables reached 216 (1967=100), 3 percent or 7 points higher than in 1978. Prices were sharply higher than in previous years from January through March 1979 due in part to high lettuce and celery prices. From April through September, fresh vegetable prices were below 1978 levels. During October and November they were again above year-earlier levels because of higher tomato, pepper, and cucumber prices.

For the rest of the winter, fresh market vegetable prices are expected to rise and seasonally above December 1979 levels. The index of farm prices for fresh vegetables in the first quarter of 1980 is likely to be 225-235 (1967=100), compared with 200 for the fourth quarter of 1979.

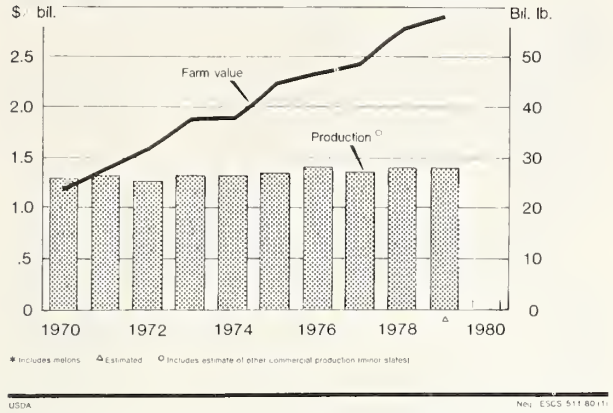


During 1979, retail vegetable prices followed grower price trends, although they fluctuated less. For the fourth quarter, the ESCS index of retail vegetable prices was 226 (1967=100). With good supplies of most items first quarter 1980 prices, barring frost damage, are expected to average about 5-10 percent less than first-quarter 1979.

1979 Recap

In 1979, production of the 22 major vegetable and melon crops totaled 264.5 million cwt., about 2 percent more than in 1978. The farm value was $2.9 billion, 6 percent more than a year earlier. Only five of the 22 crops, brussel sprouts, cabbage, celery, escarole/endive, and lettuce—declined in value from 1978. During the winter quarter all crops increased in value over year-earlier levels.

Farm Value and Production of Fresh Vegetables *



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During the rest of the year, celery prices were below 1978 levels. Lettuce prices dipped sharply below 1978 levels during the second quarter and again fell below the year-earlier level during the fourth quarter.

Prospects for Leading Items

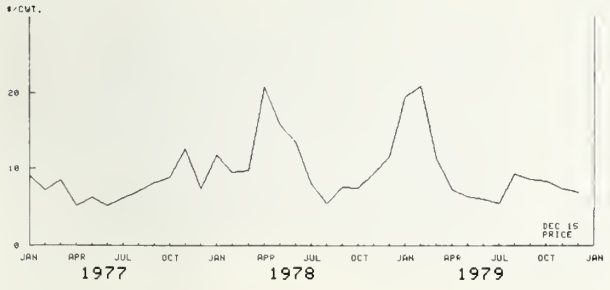
Lettuce

The 1980 winter lettuce area, at 62,000 acres, is 3 percent above a year earlier. Assuming average yields, production would be 14.6 million cwt., up 2 percent from last year.

Harvest is in full swing in the Imperial Valley of California, and supplies are plentiful. Selective farm worker strike activity continues. In Arizona, planting for the later winter harvest is in progress. The Florida crop is in good condition, and headweight is good. Harvest is increasing, and heavy volume is expected during the winter quarter, with the bulk of supplies coming from the Everglades and Zellwood areas.

F.o.b. lettuce prices at California, Arizona, and Texas shipping points ranged from $2.50-$3.00 per 24 head carton during December, only about one-third as high as a year earlier. But lettuce prices are very volatile and could change abruptly with any interruption of supply.

LETTUCE : U.S. GROWER PRICES

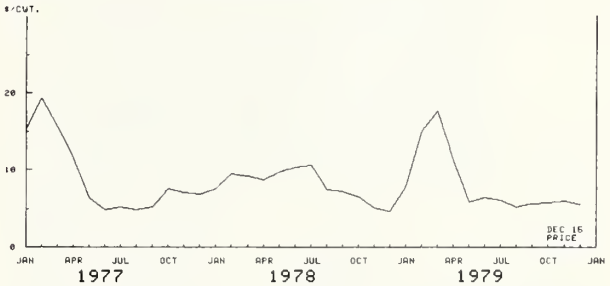


Cabbage

Prospective cabbage acreage during the 1980 winter quarter is 39 percent larger than last year. Assuming average yields, this acreage would produce 5.7 million cwt., up 38 percent from 1979 and 21 percent more than in 1978. In Texas, mature fields are producing good yields. Moisture has been adequate, and cool weather has helped to reduce insect activity.

Growing conditions in Florida have been ideal. The crop is making good progress, with heads sizing well. Harvest is expected to be in full swing by mid-January in all areas. Quality and packout are expected to be excellent. New York stocks of stored cabbage on January 1 totaled 1.28 million cwt., 7 percent more than a year earlier.

CABBAGE : U.S. GROWER PRICES

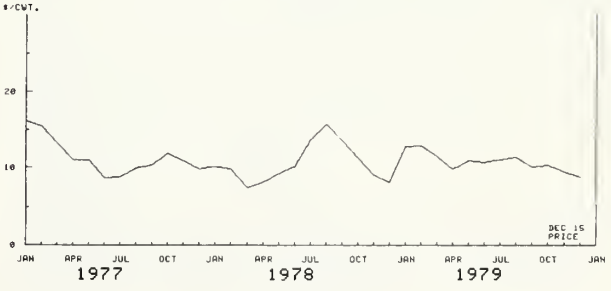


F.o.b. prices in south Texas during early January were around $2.50 a crate, down from $4.00 a year earlier. If weather continues favorable, prices will remain at current levels through the first quarter of 1980.

Carrots

Carrot acreage during the 1980 winter quarter is about 7 percent larger than last year. Growing conditions have been favorable. In California, harvesting is moderate in the Kern district and is just beginning in the desert areas. Assuming average yields, supplies of carrots are likely to be 14 percent larger than in 1979. However, Texas, a

CARROTS : U.S. GROWER PRICES



major producer, expects to harvest 6 percent less acreage this year.

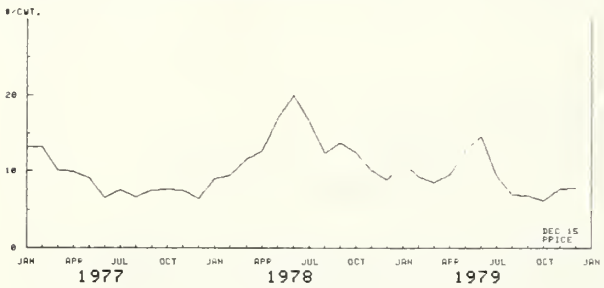
Carrot prices in early January were at the $5.00 level for 48 1-pound bags about $1.00 below the year-earlier level. Prices are expected to remain below a year ago throughout the winter quarter.

Celery

Celery acreage for harvest during the 1980 winter quarter is 1 percent less than a year earlier. Based on historic yields, production is expected to be 2 percent smaller than last year.

Harvest in Florida is active, but later than normal. Yields and sizes are slightly below normal but improving. In California growing conditions have been generally favorable in the South Coast areas.

CELERY : U.S. GROWER PRICES

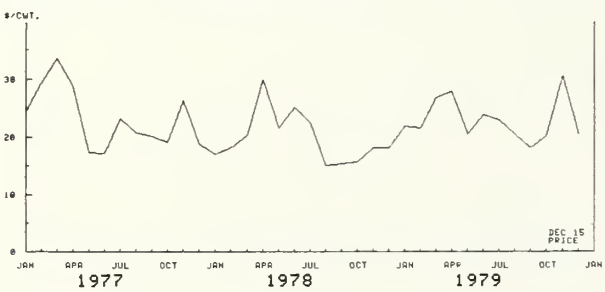


California f.o.b. prices in early January averaged $7.25 a carton compared with about $6.90 a year earlier. Florida prices were running at $6.75 compared with about $5.50 in 1979. Smaller supplies will keep celery prices above year-earlier levels during the next few months.

Tomatoes

The 1980 Florida tomato area is placed at 14,900 acres, up from 12,300 acres harvested last winter. Assuming average yields, production is expected to total 2.6 million cwt.—2 percent more than last year. Peak winter volume occurred in mid-January, when the Dade County crop reached full production. Quality and yields were mostly good.

TOMATOES : U.S. GROWER PRICES



During early January, f.o.b. prices—at $9.00 per 30 lb. carton of 6x6's—were running about 60 cents below last January levels.

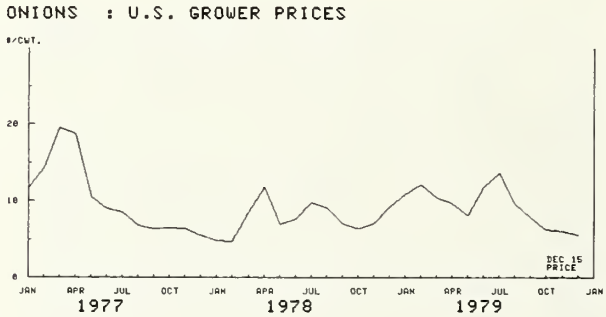
Mexican shipping activity of tomatoes, excluding cherry tomatoes, has lagged from a year earlier, but is expected to pick up seasonally during late January and early February.

Onions

The 1979 production of storage crop onions, excluding California onions, was 6 percent larger than in 1978. Onion stocks held in common and cold storage as of January 1, 1980 totaled 7.9 million cwt.—21 percent more than a year earlier.

Average monthly prices of all sales made by growers in 1979 ranged from a low of $5.35 a cwt. in December to a high of $13.70 in July, with prices trending sharply downward since then. Early January f.o.b. prices of western onions were about one-third of the high prices of a year ago, when Japanese export demand was strong. Midwestern and eastern onions were also selling below last year's levels.

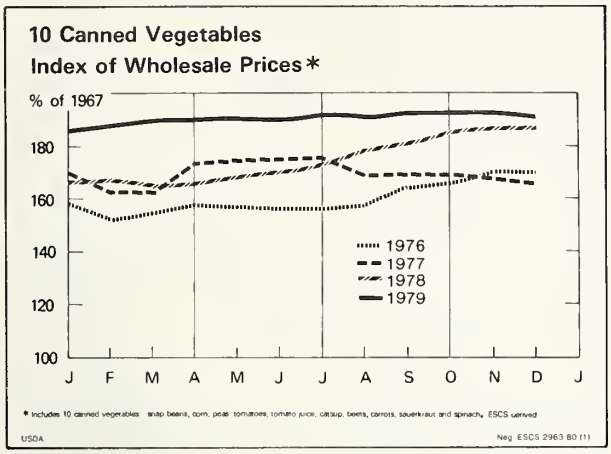
ONIONS : U.S. GROWER PRICES



The 1980 spring crop acreage—at 26,200 acres—is down 17 percent from 1979. Texas acreage for harvest is down 16 percent from a year earlier. In the Rio Grande Valley, rainfall was very plentiful during August and September, but dry conditions prevailed during October and November. Moisture returned during December. As a result of these weather shifts, land preparation was delayed and some of the early seeded onions had poor stands. Later planted onions fared better. Onions are now making good growth with harvest expected to be well underway by April 1. In the Winter Garden and Laredo areas, onions were planted in October and November and have required more than the usual amount of irrigation. However, the stands are good and the crop is making normal growth; harvest is expected to get underway in April. Onions are not among the 13 fresh winter vegetables. Winter onion supplies come from storage of northern-grown crops.

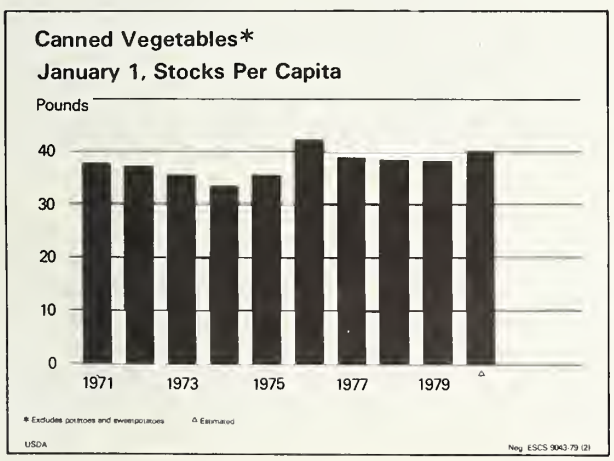
PROCESSED VEGETABLES

The combined pack of canned and frozen vegetables in 1979 was at a near-record level, according to preliminary data. Most notable were large packs of canned tomatoes, tomato products and peas. There were also large packs of canned sweet corn and beets. The pack of canned lima beans was down slightly, and final figures for sauerkraut and pickles are expected to show slight declines.



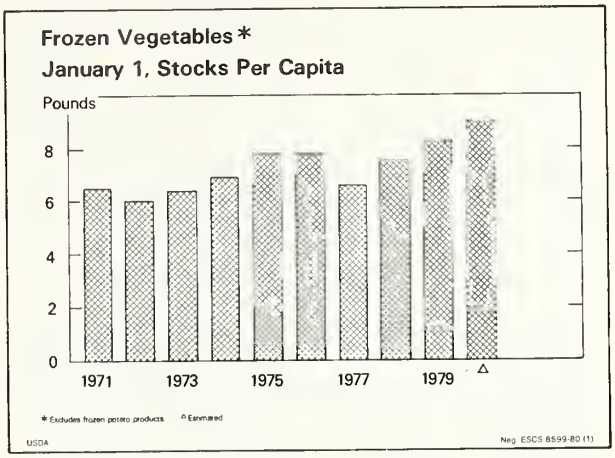
The pack of 3 major canned vegetables—beans, corn, and peas—in 1979 came to 161.7 million cases (24/303's), 15 percent more than a year earlier. With the generally smaller carryover of canned vegetables partly offsetting the larger packs, total supplies of canned vegetables in 1979/80 are moderately larger. Supplies of all canned vegetables are in ample supply and stocks of some items—particularly tomatoes and peas—are burdensome. Canned vegetable stocks on January 1 were estimated at about 41 pounds per capita.

The ESCS wholesale price index for canned vegetables in January 1980, averaged 191.5 (1967=100),



3 percent more than a year ago. In view of the large supplies of most canned vegetables, prices are expected to remain near last year's levels until the new pack gets underway next summer.

Frozen vegetable packs were generally larger this past year, with a sizeable increase in the pack of frozen peas. January 1 stocks of frozen vegetables, excluding potatoes, totaled 1.9 billion pounds, 4 percent larger than a year earlier. Per capita stocks on January 1—at 8.5 pounds—were once again larger, were slightly more than last year.



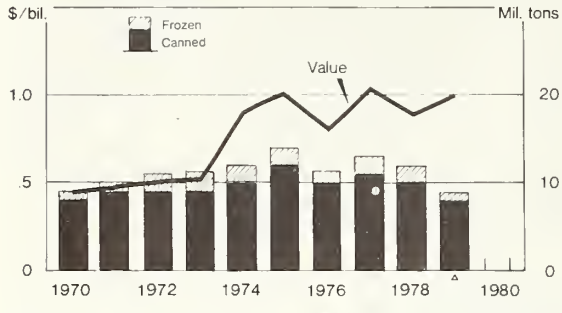
The outlook for processed vegetables indicates that prices will remain near year earlier levels. Downward price pressure resulting from ample supplies of nearly all canned and frozen vegetables will partly offset upward pressures from increased processing and marketing costs. In January 1980, many canned and frozen vegetable items were being marketed with promotional allowances off invoices and "cents-off" deals to consumers. With ample supplies and a slower-than-normal movement, the industry is calling for smaller plantings of most vegetable crops next year. Tomato processors, in particular, will attempt to restrict contracted tonnage.

More Raw Tonnage in 1979

Production of 13 processed vegetables rose to 13.3 million tons (12.1 million metric tons) last year, 11 percent more than in 1978 but virtually the same as in 1977. The farm value of these crops was placed at $1.18 billion dollars, 16 percent more than in 1978 and 9 percent more than in 1977. Total value increased for all processing vegetable crops except cauliflower.

Tomatoes are the most important processing vegetable. In 1979, processing tomato tonnage rose to 7.3 million tons, up 15 percent from a year earlier. This was more than 55 percent of the total tonnage of the 13 processing vegetables produced and

Farm Value and Production of Processed Vegetables *



△ Preliminary * Asparagus, lima beans, snap beans, beets, cabbage for kraut, sweet corn, cucumbers for pickles, green peas, spinach and tomatoes. Broccoli, carrots and cauliflower added beginning 1973.

accounted for more than 42 percent of the value. Production of green peas rose substantially in 1979.

Sweet Corn

The 1979 pack of canned sweet corn—at 60.1 million cases (24/303)—was the largest on record. In-plant recovery of raw product was exceptionally good. Because of the record-large pack and a heavy carryover estimated at 9.8 million cases, total supplies of canned sweet corn at the beginning of 1980 are record large. These stocks will easily support an expected movement of 57-58 million cases for the 1979/80 season, implying a carryover next July of about 12 million cases. Wholesale prices of consumer packs are generally about the same as, or slightly higher than a year earlier, despite heavy stocks that could tend to depress prices. Current prices reflect increased processing and marketing costs.

January 1 stocks of frozen sweet corn, at 435.3 million pounds, were 11 percent smaller than a year earlier. Cut corn was down 10 percent and on-cob frozen corn was down 8 percent. Freezer shipments have lagged last year's pace and prices are trading at less than list. Private label list for 24/10 oz. cartons remains at $5.25, but sales are usually discounted. Current billings for cut corn have been 31 cents a pound, down from the average list price of 33 cents.

Canned sweet corn: Supply and disappearance

	1977/78	1978/79	1979/80
	Mil. cases 24/303's	*Mil. cases 24/303's*	*Mil. cases 24/303's*
Carryover	9.7	7.6	9.8
Pack	56.3	57.9	60.0
Total supply	66.0	65.5	69.8
Disappearance	58.4	55.7	---

Because of the current price-movement picture, canners can be expected to contract for less tonnage next year—possibly about 1.57 million tons, about the same as in 1978. The acreage of corn for freezing in the Pacific Northwest may increase slightly if movement picks up and stocks continue below year-earlier levels.

Peas

Production of peas for canning jumped 44 percent in 1979 as yields in all of the principal pea-producing States rebounded to their pre-1978 levels.

With the sharply larger 1979/80 canned pea supply, shipments have increased, but not as much as packers would like. November 1 shipments were up only 5 percent above year-earlier levels. Current stocks are the largest in years, and a large carryover in 1980 is in prospect. But with inflationary pressures canners list prices for mid-western sweet peas are running 25-50 cents higher per case for popular retail sizes than last year. Prices for the institutional 6/10's are also about 50 cents higher than a year earlier.

Canned green peas: Supply and disappearance

	1977/78	1978/79	1979/80
	Mil. cases 24/303's	*Mil. cases 24/303's*	*Mil. cases 24/303's*
Carryover	7.7	4.4	1.6
Pack	30.2	25.3	36.5
Total supply	37.9	29.7	38.1
Disappearance	33.5	28.1	---

Raw tonnage of peas for freezing in 1979—at 239,850 tons—was 16 percent larger than the year before. The pack of frozen green peas, at 406.6 million pounds, was 37 percent larger than the 1978/79 pack, resulting in a total supply of nearly 490 million pounds for the 1979/80 marketing year—8 percent larger than a year earlier. So far this marketing year, wholesale prices for frozen bulk peas have been maintained at about the same level as last season. With the burdensome supplies and some possible price weakness this winter, freezers will probably contract for less pea acreage in 1980.

Snap Beans

The 1979 pack of canned snap beans, at 65.2 million cases, was the largest in recent memory and 15 percent larger than a year earlier. Combined with a large carryover from the 1978 pack, total supplies for the 1979/80 marketing season will be 15 percent larger than a year earlier. Raw tonnage for canning in 1979 was 11 percent

Canned snap beans: Supply and disappearance

	1977/78	1978/79	1979/80
	Mil. cases 24/303's	*Mil. cases 24/303's*	*Mil. cases 24/303's*
Carryover	5.7	5.0	6.2
Pack	54.5	57.1	65.2
Total supply	60.2	62.1	69.4
Disappearance	55.2	55.9	---

larger. Movement from canners through November 1 was about 5 percent larger than a year earlier.

Wholesale prices for consumer packs have been about the same or slightly higher than a year earlier, but the institutional 6/10 size has been selling for 50-75 cents more. This price and supply pattern indicates that green bean prices have not been keeping up with the rate of inflation. Canners will probably reduce contracted acreage in 1980. Total raw tonnage for processing will likely be less than in 1979 but more than in 1978.

Stocks of frozen snap beans, at nearly 180 million pounds were larger than last year's small supply. Raw tonnage for freezing was 3 percent smaller than in 1978. Since September 1979 wholesale prices for frozen snap beans have been steady at 42 cents per pound, f.o.b., West Coast. Freezers will also have heavy stocks and will reduce acreage back to the 1977 level of about 60-65 thousand planted acres.

Tomatoes

Raw tonnage of tomatoes for processing in 1979 totaled 7.3 million tons, very close to the 1974-78 average of 7.2 million. Nearly all of this tonnage is in California, which has reportedly packed 42.4 million cases of canned tomatoes. This has led to burdensome supplies and considerable downward pressure on prices.

Wholesale list prices for canned tomatoes have not changed since 1977 for California packs, and some grades and packs are currently priced for less than a year earlier. Promotional allowances are being liberally used in an effort to reduce stocks. The USDA has also purchased substantial quantities of canned tomatoes and tomato products for distribution through domestic food programs.

Canned tomatoes: Supply and disappearance

	1977/78	1978/79	1979/80
	Mil. cases 24/303's	*Mil. cases 24/303's*	*Mil. cases 24/303's*
Carryover	9.4	16.0	14.6
Pack	54.1	49.4	---
Total supply	63.5	65.4	---
Disappearance	47.5		

Prices for consumer sizes of catsup are the same as a year earlier in California, while prices for institutional sizes are lower. Fancy private label bottled catsup in the Midwest is generally trading $1.00-$1.50 under list, depending on the size.

With these price and supply conditions, it is apparent that canners will make drastic changes in tomato acreage requirements in 1980. With tomatoes an attractive alternative crop in California, there is a tendency for growers to exceed market needs. It appears that this year growers will be in a relatively weak bargaining position, and canners will have rigid requirements concerning location of production relative to the canning plants, length of haul, and quality standards in addition to the tonnage of tomatoes contracted. Industry sources believe canners will attempt to reduce contract tonnage in 1980 below the 6.4 million tons in 1979.

Tomato paste prices are generally on a par with last year's low prices. Institutional sizes are priced slightly lower than a year ago.

Canned tomato juice: Supply and disappearance

	1977/78	1978/79	1979/80
	Mil. cases 24/303's	*Mil. cases 24/303's*	*Mil. cases 24/303's*
Carryover	8.8	5.5	6.2
Pack	27.8	33.9	---
Total supply	36.6	39.4	---
Disappearance	31.1	33.2	---

Prices for tomato juice are also the same as or slightly lower than last year, reflecting a substantial carryover into 1979 and a large pack in California last fall. Cases of 12/46 oz. tomato juice were selling for about the same as last year in the east and midwest but 10-25 cents lower in California.

The supply of canned tomatoes in 1979/80 is a continuation of the burdensome supplies that have plagued the industry for the past 3 years. The industry seems unable to balance the carryover from one year with the pack of the following year.

Cucumbers for Pickles

A near-record large pack of pickles was made during 1979 from 672,920 tons of raw cucumbers. Production of 75.4 million cases (24/303's) was only 2 percent less than the previous year's record. This pack, combined with a large carryover from 1978, resulted in record large supplies for the 1979 marketing year. Disappearance of pickles during the marketing year was also at a record pace, so carryover stocks into 1979 were heavy. Therefore, it appears that contracted acreage in 1980 will be

about the same as in 1979. In 1979 there were large production increases in California, Maryland, North Carolina, and Ohio, while other major producers such as Michigan, Texas, and South Carolina showed declines.

Spinach

Spinach canning activity declined again in 1979, down to 52,920 tons, 16 percent below the year before. Canners' stocks on October 1 totaled 2.4 million cases (24/303's), 20 percent less than a year earlier and the smallest in years. Prices reflect the smaller supply. Consumer and institutional packs are selling for about 50 cents more per case than a year earlier in both the Ozarks and California.

The sharp increase in spinach production for freezing in California in 1979 resulted in a two-thirds increase in total U.S. tonnage. January stocks of 58 million pounds were 46 percent larger than a year earlier. Wholesale prices for this crop are about the same as last year. Institutional packs of chopped and leaf, at 24 to 26 cents a pound, are running 1 to 2 cents higher than a year ago. It appears that winter spinach acreage may be reduced slightly this year in view of the fairly heavy stocks position.

Asparagus

In 1979, 2.8 million cases (24/303's) of asparagus were canned, 17 percent less than a year earlier and the smallest domestic pack in recent history. October 1 stocks, at 2.2 million cases, however, were 5 percent larger than a year earlier, but were not burdensome. Wholesale prices, at $30 per case of 24/300's, were the same as last year and were meeting some consumer resistance.

Stocks of frozen asparagus on December 31, 1979, at nearly 11 million pounds, were 114 percent larger than in 1978. Only 63,000 tons of asparagus were used for processing in 1979—8 percent more than in 1978, but well below the 1977 total. Asparagus processors continue to be caught in the squeeze between high production costs—particularly high labor costs for harvesting—and consumer resistance to high retail prices.

Beets

A larger tonnage of beets produced in Wisconsin pushed U.S. total canning beet production 13 percent ahead of last year. The larger 1979 pack along with a large carryover pushed supplies well above the levels of the previous two years. November stocks, at 16.0 million cases, were 6 percent larger than a year earlier. The increasing popularity of beets as a salad bar item indicates production may be maintained at the current level in 1980. Wholesale prices for popular retail and institutional can sizes have been maintained at the same level as last year despite the heavy supplies.

Sauerkraut

Kraut cabbage tonnage in 1979 rebounded to 238,710 tons from a low of 217,790 tons a year earlier. January 1 stocks of sauerkraut, at 8.0 million cases 24/303 equivalent, were up from last year's small supply. Wholesale prices have been running 50-75 cents per case higher than a year earlier despite the larger supplies. Prices are expected to remain strong through next summer.

Other Frozen Vegetables

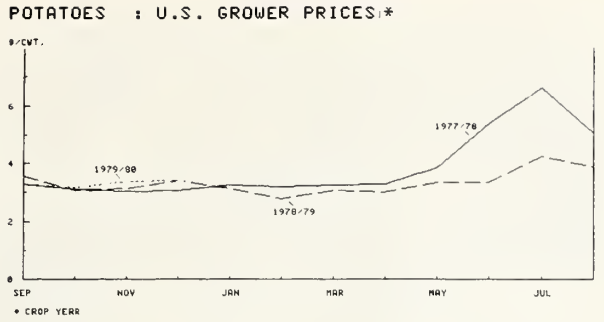
January 1 stocks of frozen carrots stood at 169 million pounds, 5 percent larger than last year and the largest in history. Last fall, stocks were built up at a rapid rate. Due to the large supplies, wholesale prices have weakened. There was another large pack of broccoli in 1979, as 141,000 tons went for this purpose. This is primarily a California crop, with other western States contributing 3 percent. Prices are firm to strong despite relatively large stocks of this increasingly popular vegetable. Stocks of frozen cauliflower on December 31 were 2 percent less than a year earlier, as a 23-percent reduction in the fall pack helped bring inventories into balance.

POTATOES

Fall potato production declined to 301.6 million cwt. in 1979, 7 percent below the record large 1978 crop. This year's crop was harvested from 1.07 million acres, 7 percent less than in 1978. The U.S. average 1979 fall crop yield of 281 cwt. per acre, a new record, is up 1 cwt. per acre from last year and 11 cwt. per acre more than 1977. High yields were recorded in Washington (475 cwt. per acre), Oregon (410 cwt. in "other" counties), California (370 cwt.), and Idaho's 10 southwestern counties (340 cwt. per acre).

Marketing the 1979 Crop

The record large fall crop of 323.5 million cwt. in 1978 posed serious marketing problems, especially for Western Russet producers. The 1979 crop will be much less burdensome, although the smaller crop has not brought forth the higher prices that were expected and movement, overall, has been sluggish. Still, processors in the Pacific Northwest have contracted for a substantial share of their needs in the $3.20-$3.35 per cwt. range. This, plus stronger fresh market prices, buoyed the average



price received by growers for the last quarter of 1979. The U.S. price received by growers in December 1979, averaged $3.40 per cwt. up from $3.02 a year earlier.

In the nine western States, potato production of 189 million cwt. was 8 percent below the 207 million cwt. produced a year earlier. Harvested area totaled 586,000 acres, compared with 637,000 acres harvested in 1978. The average yield of 324 cwt. per acre was 1 cwt. per acre less than a year earlier. Idaho average prices for December rose to $3.05 a cwt., compared with $2.45 a year earlier. Open market sales to processors were very few during November and December, with limited movement of cellar-run stock at lower prices.

In the midwest, production of 62.3 million cwt. is 10 percent below the 69.3 million cwt. produced a year earlier. Here too, yields were down, averaging about 212 cwt. per acre, 7 percent less than was produced in 1978. Prices for round reds in early January were running ahead of last year, with prices for 100-pound sacks, f.o.b., the Red River Valley at $4.38, compared with $3.00 a year earlier.

The crop in the seven eastern States was placed at 49.9 million cwt., 5 percent above the 47.3 million cwt. harvested in 1978. The average yield was placed at 257 cwt. per acre, up significantly from the 234 cwt. per acre produced in 1978. During December and January, f.o.b. prices for 50-pound sacks of potatoes in Maine and Long Island were 20 to 30 cents lower than a year ago.

U.S. stocks of potatoes remaining to be sold on January 1, 1980, totaled 183 million cwt., the second largest ever reported for that date. This means that only 114 million cwt. of potatoes had been utilized between the fall harvest and January 1. Movement during this period has averaged 119 million cwt. during the past 10 years and recently has been above 122 million cwt.

Projected Use of 1979 Tonnage

Table stock sales of the 1979 crop are expected to total about 113 million cwt., slightly more than was used from the 1978 crop, but less than was used from the 1977 crop. Fresh use is expected to increase because the eastern crop is large and prices are low.

Another large quantity—perhaps a record amount—will probably go to freezers in 1979/80. Stocks of frozen potatoes were 4 percent larger on January 1 than a year earlier. But with continued strong demand for frozen potatoes—particularly frozen french fries—both domestically and in export markets, and with generous supplies to draw from, freezers are likely to absorb near-record large quantities of raw product this season.

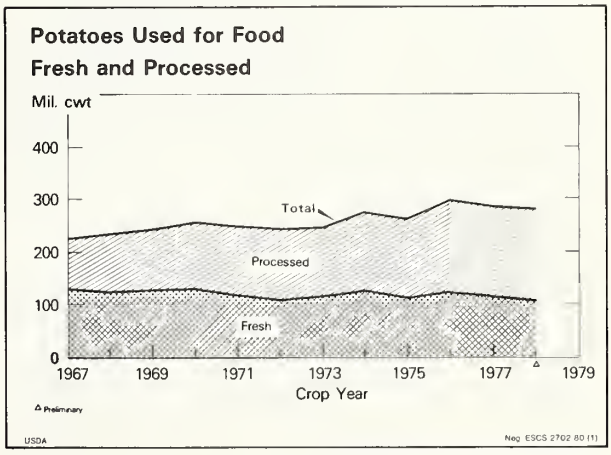
The manufacture of dehydrated potatoes continues to decline. The carryover from the 1977 pack was record large and carryover from 1978 was also high. However, exports of potato flakes and granules have expanded at a good pace. Between October 1, 1978-September 30, 1979, exports of flakes and granules totaled 5.7 million cwt. (raw weight equivalent), up 32 percent from a year earlier. Exports of other dehydrated potatoes totaled 2.4 million cwt. (r.w.e.), up 4 percent. Japan is our largest customer for dehydrated potatoes. West Germany and the United Kingdom account

Table 1—Potatoes: January 1 total stocks by areas, United States

Year	Eastern States	Central States	Western States	Total[1]
	Mil. cwt.			
1972	38.0	34.1	79.3	151.4
1973	28.0	27.6	78.8	134.4
1974	25.3	28.0	80.3	133.7
1975	35.3	35.4	92.4	163.1
1976	27.0	28.0	104.2	159.1
1977	27.1	29.2	118.4	174.8
1978	28.7	37.6	111.9	178.2
1979	26.3	41.0	128.8	196.1
1980	30.6	34.4	117.7	182.8

[1] May not add to total due to rounding.

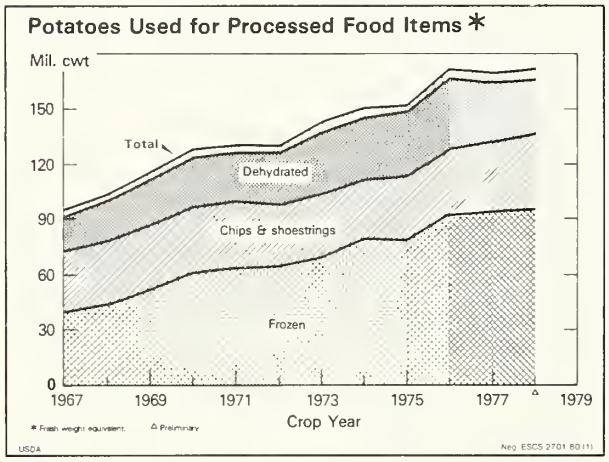
Source Potato Stocks, CRB, ESCS.

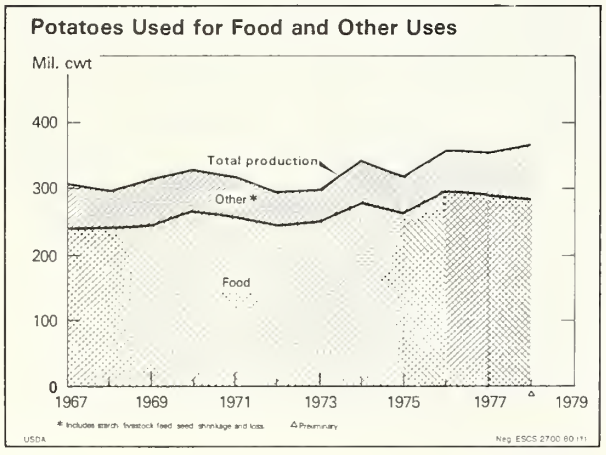


for most of our exports to Europe. In total, approximately 30 million cwt. of potatoes are expected to be used for dehydration in 1980, down from 33 million cwt. in each of the 2 preceding years.

The amount of potatoes used for chips is also expected to decline from 39 million cwt. for the 1978/79 crop to about 36 million for the current season. Potato chip use is closely tied to consumer disposable incomes.

Potato utilization in 1980 is expected to follow the usual pattern of about 25 million cwt. to seed, 9 million to feedlot operations, and about 2 million to starch and flour.





Winter Potato Prospects

California and Florida winter production of 2.3 million cwt. is 2 percent less than a year earlier. The smaller winter potato crop is not expected to affect the U.S. average price levels since it accounts for only 1 percent of the annual U.S. output.

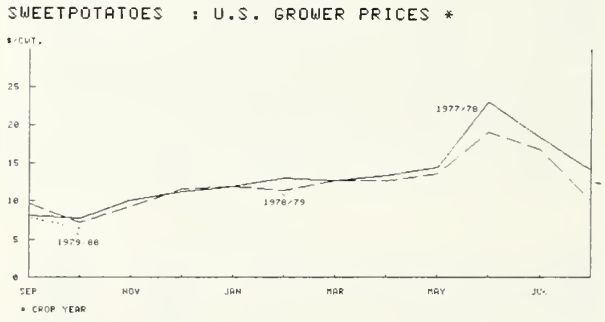
SWEET POTATOES

With the largest sweetpotato production in years, grower prices during the fall of 1979 were substantially lower than a year earlier. In December, grower prices averaged $8.33 per cwt. compared with $11.30 in December of 1978.

The canned sweetpotato pack between July and October was 2.7 million cases of 24/303's. This was only 4 percent larger than the 1978 July-October pack and reflects the large carryover on July 1, 1979, which, at 2.2 million cases, was 229 percent larger than a year earlier. On October 1, stocks were still 53 percent larger than in 1978, but lower prices had resulted in the distribution of 1.7 million cases of 24/303's during the July 1-October 1 period—48 percent more than a year earlier.

Wholesale prices for canned sweetpotatoes have been lower than last year, with prices for nearly all commonly used can sizes $1.25 to $3.50 per case lower than last year. A major exception is the 24/3 squat size which has been only 50 cents per case lower this year. Syrup pack 6/10's fell to $11.25 per case compared with $14.75 in December 1978. The 24/303's were $10.25 per case, $1.25 lower than a year earlier.

Season unloads of fresh sweetpotatoes in major markets through January 25 were running 7 percent more than during the same period a yeaer earlier. Prices for fresh Porto Rico type sweetpotatoes, f.o.b., Louisiana shipping points stood at $7.20 per 50-pound carton on December 15, compared with $7.63 a year earlier. This second successive year of large supplies and low prices will make it less attractive to growers to expand sweetpotato acreage in 1980. Depending on the profitability of alternative crops available to sweetpotato producers, some shifting of acreage from sweetpotatoes to other crops is indicated.



MUSHROOMS

In 1979, the mushroom industry experienced rapid growth as more production capacity was added. Mushrooms have become a year-round

product and, accordingly, market news reports are now issued on a year round basis. During the time when supplies were limited (July-September) and when market news reports were formerly not available, prices for US #1 clean cut mushrooms in bulk reached new highs. In August prices reached 85 cents a pound and remained in the 80-85 cents range through September, when increased supplies forced prices down. In December, however, prices for fresh mushrooms remained in the 68-70 cent range, about the same as a year earlier.

Grower sales of mushrooms for processing have been 62 to 64 cents a pound, about the same as a year earlier. Prices for both fresh and processing mushrooms have held up well.

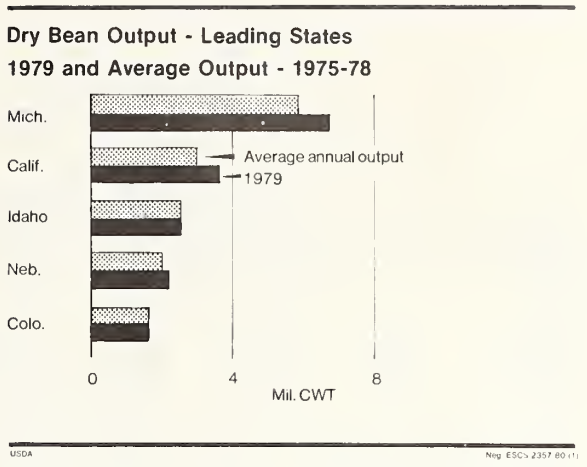
According to the U.S. International Trade Commission (ITC), during the third quarter of 1979 apparent U.S. consumption of processed mushrooms amounted to 49.9 million pounds, up 14 percent from the same period in 1978. U.S. imports of processed mushrooms during July-September 1979 rose to 30.1 million pounds, an increase of 29 percent over 1978. Imports supplied 60 percent of apparent consumption, up from 53 percent a year earlier, while U.S. production of processed mushrooms was 34 percent lower in 1979 than in 1978.

Imports from Taiwan, the principal U.S. supplier, at 18.0 million pounds, were up substantially both in quantity and share of the U.S. market. Taiwan accounted for nearly 60 percent of the U.S. mushroom imports during the third quarter of 1979, compared with 51 percent during the same period a year earlier. The Republic of Korea and Hong Kong also increased shipments to the United States to 7.7 and 3.5 million pounds, respectively.

The performance of the processed mushroom industry has shown a mixed pattern between the third quarters of 1977 and 1979. Production, sales, and ending inventories of canned mushrooms declined, but imports and apparent consumption increased, with the ratio of imports to consumption rising sharply from 46 to 60 percent during the period. Sales of frozen mushrooms rose over the 3-year period from 0.9 to 1.5 million pounds.

DRY EDIBLE BEANS

Total U.S. dry bean production in 1979 rose to a record 20.7 million cwt.—up 9 percent from 1978 and 24 percent more than in 1977. The largest increases occurred in the White classes of navy's—up 11 percent—and great northerns—up 7 percent—and the colored classes of pintos—up 7 percent—and pink—up 17 percent. Red kidney bean production was down 11 percent.



Exports of all classes September 1 to December 1 were 1.5 million cwt., compared with 1.7 million a year earlier.

Price Review by Classes

In spite of larger supplies, pinto bean dealer prices have been running about one-third above last year's levels this fall. In late October dealer prices began to rise sharply and are now above the relatively high prices of June and July 1979. A combination of a drought and early frost in Mexico is reported to have cut Mexican dry bean production by one-third. Under these circumstances, Mexico becomes a large importer of pinto beans, and other colored varieties. This anticipated increase in exports to Mexico is responsible for sharply rising dealer prices.

Dealer prices of kidney beans began rising above last year's levels during the second week of September, and by the second week of December were 40 percent above a year earlier. Further price rises are expected as a result of this year's smaller crop and prospects of increased exports to Mexico.

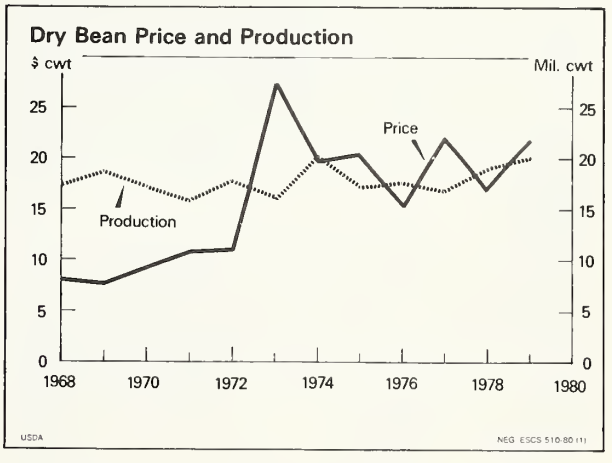
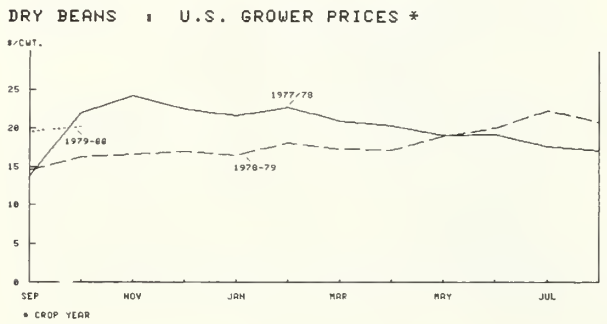


Table 2—U.S. exports of dried edible beans by country of destination

Country	Marketing year beginning		
	Sept. 1976	Sept. 1977	Sept. 1978
	1,000 cwt.		
United Kingdom[1]	592.1	1,182.8	926.8
Netherlands	305.9	1,454.4	445.6
Algeria	134.4	424.4	248.8
Canada	273.9	390.6	289.2
Japan	637.2	349.5	284.8
Mexico	132.4	193.7	366.2
France	264.9	168.2	270.9
Venezuela	277.2	128.9	371.1
Australia	40.9	55.6	45.9
Other countries	1,318.2	963.4	2,096.4
Total U.S. exports	3,977.1	4,311.5	5,345.7

[1] Includes Northern Ireland.



Production of blackeye peas increased from 778,000 cwt. in 1978 to 930,000 in 1979. Dealer prices declined from their high level of $28.50-$29.00 per cwt. last July and August to $23.25-$23.75 per cwt. in October. Prices recovered during the last week of October and reached $26.25-$26.50 during the first two weeks of November. Since then they have been moving downward but are still above year-earlier levels.

Baby lima prices during January through September 1979 were about $2 to $3 per cwt. above last year's levels. Since October, dealer prices have been running about $2 per cwt. below year-earlier levels. This is not surprising since 1979 production is 27 percent greater than in 1978. Throughout 1979, dealer prices for large limas were well above year-earlier levels despite a 14-percent increase in production. Production increased despite a reduction in acreage because of favorable growing conditions.

Among the white classes, Michigan navy bean dealer prices were $21.50 per cwt. during November and December, compared with $16-$17 a year earlier. Michigan growers reduced acreage but good growing and harvesting conditions kept yields unusually high and total production actually increased over last year.

Despite a 7-percent increase in production, dealer prices of Great northerns during the fall of 1979 were about $5 a cwt. above year-earlier levels.

Outlook for 1980

Dry bean exports (September through December) have been running slightly behind the year-earlier pace, but are expected to speed up considerably as a result of increased exports to Mexico of pintos, blacks, pinks, dark reds, and light reds. So far, Mexico has purchased around 60,000 metric tons of colored beans. Mexico is also attempting to contract with U.S. suppliers for beans from the 1980 crop. Prices to growers of all beans have been rising since September, with levels about $5.00 per cwt. above 1978 levels despite the larger crop.

Domestic use of dry beans has weakened since 1974. Per capita consumption in 1978 was 5.9 pounds, down from 6.7 pounds in 1974. With a larger crop in 1979, current retail prices are holding steady to lower and, as a result, consumption might now be slightly above the 1978 level.

DRY EDIBLE PEAS AND LENTILS

The 2.0 million cwt. crop of dry peas for 1979 was 42 percent less than the record crop of 1978. Grower prices have been well above year-earlier levels. Lentil production—at 1.4 million cwt.—set a new record over the 1978 production record of 1.3 million. Lentil prices in the current season have ranged from $28 to $30 a cwt. and with continued strong export demand, may be attractive enough for growers to increase 1980 plantings. Green peas have been selling in the $9.30-$9.65 per cwt. range, compared with $8.25-$8.70 a year earlier. With these higher prices, growers may increase 1980 plantings.

With larger supplies of lentils and smaller supplies of dry peas, export activity was mixed. For the first four months of the shipping season lentil exports of 41 million pounds exceeded year-earlier levels and were equal to the trade in dry peas. Dry pea exports for the first four months of the current shipping season, at 48 million pounds, were 40 percent less than the year-earlier volume.

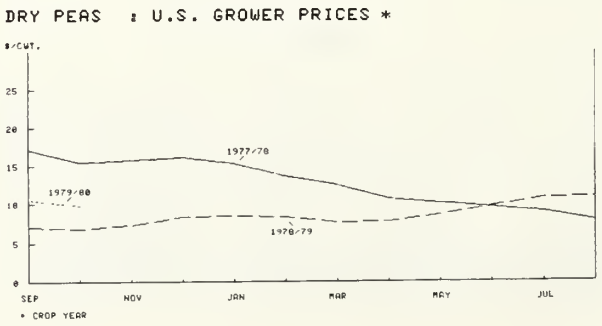


Table 3—Beans, dry edible: Production by commercial classes, 1974-79[1]

Class	1974	1975	1976	1977	1978	1979[2]
	1,000 cwt.					
White:						
Pea, navy	6,709	4,140	4,846	5,209	5,795	6,418
Great northern	2,083	1,409	1,767	1,603	1,863	1,989
Small white[3]	666	239	335	248	200	181
Total, white	9,458	5,788	6,948	7,060	7,858	8,597
Colored:						
Pink	1,030	1,154	990	753	685	801
Pinto	4,776	6,367	5,792	4,517	5,528	5,940
Red kidney	1,510	1,477	1,377	1,285	1,843	1,637
Small red	448	494	437	305	359	468
Cranberry	165	222	257	390	375	305
Black turtle soup	192	212	157	109	171	263
Total, colored	8,212	9,926	9,010	7,359	8,961	9,414
Lima:						
Large	670	408	522	540	458	520
Baby	574	416	378	475	512	650
Total, lima	1,244	824	900	1,015	970	1,170
Other:						
Blackeye	1,092	499	607	800	778	930
Garbanzo	83	119	46	63	101	149
Other[4]	331	286	275	313	372	405
Total, other	1,506	904	928	1,176	1,251	1,485
United States	20,329	17,442	17,786	16,610	17,789	20,665

[1] Excludes beans grown for garden seed. [2] Preliminary. [3] Includes flat small white. [4] Includes yelloweye.

Source: Crop Production, CRB, ESCS.

Table 4—Vegetables and melons for fresh market: Commercial acreage, production, and value for principal crops, 1977, 1978, and 1979[1]

Commodity	Harvested acreage			Production			Value					
							Per cwt.			Total		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
	1,000 acres			*1,000 cwt.*			*Dollars*			*1,000 dollars*		
Artichokes[2]	10.8	9.9	9.7	713	525	873	19.30	27.00	27.70	13,775	14,201	24,220
Asparagus[2]	85.8	81.4	79.2	2,181	1,827	1,862	36.80	43.40	51.20	80,249	79,216	95,283
Beans, snap	78.3	84.7	83.8	2,884	2,809	2,845	21.10	26.10	27.50	60,965	73,310	78,100
Broccoli[2]	70.9	68.3	71.1	5,694	5,399	5,818	16.30	18.10	19.00	92.748	97,619	110,641
Brussels sprouts[2]	5.8	5.9	5.5	783	885	770	18.90	21.40	21.50	14,831	18,968	16.520
Cabbage[3]	81.2	85.9	82.5	19,111	20,125	19,436	8.93	8.48	8.60	165,243	168,354	164,793
Cantaloups	79.5	93.9	89.1	10,760	12,856	12,322	10.60	9.64	11.20	113,991	123,946	138,350
Carrots[2]	69.5	73.7	77.8	19,208	19,289	20,851	7.36	6.73	7.08	141,432	129,810	147,634
Cauliflower[2]	37.4	41.6	42.4	3,707	3,836	4,156	19,80	21.20	21.30	73,387	81,244	88,567
Celery[2]	33.8	34.4	36.1	16,561	16,445	17,560	8.51	11.90	9.16	140,978	195,946	160,820
Corn, sweet	169.9	169.2	167.5	13,890	13,349	13,213	8.07	8.84	10.00	112,148	118,037	132,274
Cucumbers	51.9	53.8	50.7	5,616	5,886	5,818	10.00	72.10	14.70	56,338	71,250	85,273
Eggplant	3.2	3.4	3.9	641	645	729	11.00	12.60	15.90	7.058	8.105	11.621
Escarole	7.8	7.6	8.3	1,025	1,061	1,140	15.90	20.90	19.00	16,331	22,185	21,700
Garlic[2]	10.4	13.0	14.2	1,144	1,560	1,846	14.30	15.80	15.20	16,336	24,723	27,974
Honeydews	15.5	18.5	20.8	2,591	3,413	3,531	9.87	9.62	10.80	25,561	32,846	38,126
Lettuce	231.5	239.2	244.1	59,907	60,262	60,315	6.94	9.90	9.56	415,740	596,730	576,741
Onions[2 3]	108.0	121.2	123.4	34,406	35,936	38,485	6.76	7.82	7.58	203,432	250,375	259,732
Peppers, green[2]	55.9	53.0	58.7	5,333	5,158	5,470	16.40	19.40	19.90	87,637	100,264	108,980
Spinach	9.9	10.7	13.5	812	874	978	16.90	21.50	24.60	13,746	18,805	24,085
Tomatoes	124.3	129.5	128.3	19,779	22,132	22,320	20.70	19.60	23.20	408,451	434,847	517,769
Watermelons	227.4	218.2	208.8	27,020	25,702	24,126	3.43	3.98	4.60	92,809	102,226	110,988
Total[4]	1,568.5	1,617.0	1,619.4	253,766	259,974	264,464	9.27	10.60	11.10	2,353,186	2,763,007	2,940.199

[1] Includes Hawaii. [2] Includes quantities used for processing. [3] Value exceeds production not marketed because of shrinkage and loss. [4] May not add due to rounding.

Source: Vegetables Annual, CRB, ESCS.

Table 5—Vegetables, fresh: Representative wholesale prices (wholesale lot) sales at New York and Chicago for stock of generally good quality and condition (U.S. No. 1 when available) indicated periods, 1978, 1979, and 1980

Market, commodity and State of origin	Unit	Tuesday nearest mid-month					
		1978-79			1979-80		
		Nov. 14	Dec. 19	Jan. 16	Nov. 13	Dec. 18	Jan. 15
		Dollars					
NEW YORK							
Beans, snap round green type (Florida)	Bu. hamper and crt.	9.50	14.50	19.50	14.50	11.50	15.00
Broccoli, bunched (California)	14's crt.	7.25	10.00	8.75	10.00	9.75	8.50
Cabbage, domestic round type (Florida)	1-3/4 bu. crt.	---	---	5.25	---	6.00	6.25
Cabbage, Danish type (New York)	50-lb. sack	3.25	---	3.25	4.25	---	3.00
Carrots, topped, washed (California)	48-1-lb. film bag ctn.	7.25	8.50	14.50	7.75	7.50	12.50
Celery, Pascal (Florida)	2-4 doz. 16 in. crt.	---	---	---	---	---	---
Celery, Pascal (California)	2-3 doz. 16 in. crt.	10.00	10.50	14.00	10.00	10.25	13.50
Corn, sweet, yellow (Florida)	4½-5 doz. crt.	5.75	9.00	6.75	7.50	6.25	9.00
Cucumbers, (Florida)	Bu. basket	10.50	10.00	---	15.00	13.50	---
Lettuce, Iceberg type (Arizona)	2 doz. ctn.	9.50	10.50	---	---	5.75	---
Onions, yellow, medium (New York)	50-lb. sack	3.25	3.25	3.87	3.25	3.15	3.15
Peppers, green, California Wonder (California)	Bu. basket	8.50	10.00	7.25	9.50	14.50	13.50
Spinach, savoy type (Texas)	Bu. basket	---	---	---	---	---	---
CHICAGO							
Beans, snap round green type (Florida)	Bu. hamper	9.00	14.50	15.00	16.50	14.00	16.25
Broccoli (California)	14's crt. and ctn.	7.00	9.00	7.75	8.75	9.50	8.00
Cabbage, domestic round type (Texas)	1-3/4 bu. crt.	---	4.25	11.50	---	5.50	5.00
Carrots, topped, washed (California)	48-1-lb. film bag, mesh master	7.25	8.50	10.00	7.50	7.50	9.25
Cauliflower (California)	Film wrapped 12's ctn.	9.00	13.50	11.00	11.50	8.50	7.75
Celery, Pascal type (California)	2-3 doz. 16 in. crt.	10.50	10.00	13.00	9.25	10.00	10.50
Corn, sweet, yellow (Florida)	5 doz. crt.	6.50	9.00	8.25	8.75	7.00	9.00
Cucumbers (Florida)	Bu. basket	8.50	8.00	---	15.50	---	---
Lettuce, Iceberg type (Arizona)	2 doz. heads, ctn.	---	8.75	---	---	5.65	7.25
Onions, yellow, large (Idaho)	50 lb. sack	5.75	9.00	9.38	5.38	5.00	4.50
Onions, yellow, medium (Midwestern)	50 lb. sack	3.88	3.50	3.63	3.75	3.15	3.25
Peppers, green, California Wonder type, large (Florida)	Bu. basket	9.50	11.50	9.75	---	17.50	12.50
Tomatoes, greenhouse, medium (Midwestern)	8 lb. bu. basket	---	---	---	---	---	---

Weekly summary of terminal market prices, AMS, USDA, Market News Report.

Table 6—Vegetables, fresh: Average f.o.b. shipping point prices, per hundredweight, United States, indicated periods, 1978 and 1979

Commodity	1978		1979		
	November	December	October	November	December 1-15
	Dollars				
Beans, snap	20.20	22.50	27.30	29.80	27.00
Broccoli	20.30	22.70	---	---	---
Cabbage	5.11	4.69	5.78	5.96	5.57
Cantaloups	11.20	14.10	12.80	14.50	21.70
Carrots	8.99	8.64	10.40	9.43	8.84
Cauliflower	21.60	30.00	---	---	---
Celery	10.10	9.05	6.16	7.74	7.88
Corn, sweet	8.01	14.50	12.80	11.10	9.70
Cucumbers	9.56	11.00	15.60	20.60	19.50
Lettuce	9.48	12.70	8.41	7.48	6.98
Onions	7.05	9.53	6.35	6.08	5.65
Peppers, green	20.40	19.90	17.10	23.60	34.30
Spinach	17.50	20.20	---	---	---
Tomatoes	18.10	20.10	20.20	30.60	20.50

Source Agricultural Prices, CRB, ESCS.I monthly.

Table 7—Vegetables, commercial for fresh market: Index numbers (unadjusted) of prices received by farmers, United States by months[1]

Period	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Av.
	(1967=100)												
1950-54 .	87	82	78	91	82	75	72	62	57	66	77	83	76
1955-59 .	83	90	91	89	84	77	72	63	64	70	78	79	78
1960-64 .	94	94	94	93	88	85	79	66	66	69	83	83	83
Year													
1966 ..	110	115	101	108	94	99	115	102	91	92	101	95	102
1967 ..	100	94	96	110	104	128	109	84	80	88	101	104	100
1968 ..	119	117	125	129	105	98	92	86	92	91	113	118	107
1969 ..	104	109	113	110	118	97	97	94	90	111	151	130	110
1970 ..	130	123	123	109	121	110	101	96	111	95	102	95	110
1971 ..	111	116	149	135	126	127	119	101	99	121	172	138	126
1972 ..	155	131	115	134	122	123	116	125	129	112	147	139	129
1973 ..	155	154	170	200	190	190	179	131	125	122	127	129	156
1974 ..	136	162	131	151	170	171	151	140	140	163	167	146	152
1975 ..	169	169	166	177	168	206	177	156	159	159	174	189	173
1976 ..	195	178	180	186	132	155	169	160	177	190	186	171	173
1977 ..	240	253	266	219	182	150	169	160	166	179	212	175	198
1978 ..	207	201	209	296	247	251	220	172	179	172	180	195	211
1979[2] .	265	299	255	210	204	203	189	192	181	196	212	199	217

[1]The index for commercial fresh market vegetables was revides, beginning January 1958, to reflect changes in the method of reporting prices. All prices now are reported on a f.o.b. basis. [2] Preliminary.

Source: Agricultural Prices, CRB,ESCS.

Table 8—Vegetables for commercial processing: Acreage, production, and season average price per ton, 1977, 1978, and 1979

Commodity	Harvested acreage			Production			Price per ton		
	1977	1978	1979	1977	1978	1979	1977	1978	1979
	1,000 acres			*1,000 Tons*			*Dollars*		
Asparagus	N/A	N/A	N/A.	73	58	63	638.00	771.00	903.00
Beans, lima[1]									
Canning	22	27	26	20	25	24	283.00	302.00	311.00
Freezing	38	42	38	55	58	60	364.00	384.00	389.00
Beans, snap									
Canning	200	211	221	519	543	601	143.00	144.00	150.00
Freezing	57	69	64	157	174	167	154.00	152.00	163.00
Beets	14	17	17	206	222	250	40.70	39.70	42.60
Cabbage for kraut	11	11	10	235	218	239	30.50	31.50	31.70
Corn, sweet[2]									
Canning	321	298	297	1,580	1,575	1,614	46.00	46.80	47.40
Freezing	133	131	120	796	860	833	56.80	55.40	58.80
Cucumbers for pickles	124	134	132	624	685	673	126.00	130.00	145.00
Peas, green[1]									
Canning	221	217	236	297	254	368	208.00	210.00	206.00
Freezing	130	139	153	192	207	240	202.00	200.00	218.00
Spinach									
Canning	10	11	8	64	63	53	74.50	79.00	84.80
Freezing	10	9	13	90	72	101	65.00	78.40	86.70
Tomatoes	347	296	312	7,779	6,368	7,331	64.10	64.20	67.60
Broccoli	N/A	N/A	N/A	156	138	141	270.00	293.00	319.00
Carrots	N/A	N/A	N/A	417	416	468	43.70	45.70	47.40
Cauliflower	N/A	N/A	N/A	78	100	85	302.00	332.00	319.00
Total[3]	N/A	N/A	N/A	13,338	12,036	13,311	80.70	84.10	88.40

[1] Production and price on a "shelled" basis. [2] Corn in the husk. [3] May not add to total due to rounding.

N/A=Not available.

Source: Vegetable Annual CRB, ESCS.

Table 9—Vegetables, Frozen: Cold storage holdings and indicated disappearance, September 1 to December 31

Commodity	December 31			September 1 - December 31 net change		
	1977	1978	1979[1]	1977	1978	1979[1]
	Million pounds					
Asparagus	10	5	11	-7	-4	-5
Beans, lima:						
Fordhook	23	25	39	10	7	14
Baby	72	79	76	52	47	36
Total	95	104	115	62	54	50
Beans, snap:						
Regular	84	108	119	-25	-52	-16
French style	46	56	61	-11	-6	-2
Total	130	166	180	-36	-58	-18
Broccoli:						
Spears	55	48	50	6	3	75
Chopped and cuts	55	52	55	3	2	3
Total	109	100	105	9	5	78
Brussel sprouts	38	50	48	54	39	29
Carrots:						
Diced	106	93	98	88	47	70
Other	49	70	71	19	36	17
Total	155	167	169	107	83	87
Cauliflower	52	86	85	31	47	31
Corn, sweet:						
Cut	222	242	214	75	101	70
On-cob	201	240	221	111	133	104
Total	423	482	435	186	234	174
Mixed vegetables	37	37	50	7	3	4
Okra	34	46	36	-5	-6	-11
Onions:						
Rings	10	10	12	2	(3)	3
Other	17	15	15	1	-2	1
Total	27	24	27	3	-2	4
Peas, Blackeyed	16	14	12	5	-1	-1
Peas, green	226	228	278	-126	-125	-115
Peas, and carrots	12	13	11	(3)	1	(3)
Spinach	58	39	58	-35	-31	-31
Southern greens	34	38	27	8	9	10
Other vegetables	190	210	196	35	40	41
Total vegetables[2]	1,645	1,819	1,893	277	220	221
Potatoes:						
French fried	719	665	688	234	132	104
Other potato products	111	113	124	19	19	18
Total frozen potatoes	830	778	872	253	151	122
Grand Total[2]	2,475	2,597	2,705	531	371	244

[1] Preliminary. [2] May not add to total due to rounding. [3] Less than 0.50.

Source: Cold Storage, CRB, ESCS.

Table 10—Fresh Vegetables: Retail price, marketing margin, and farm value per unit, sold in New York City, indicated months, 1978 and 1979

Commodity, month, and retail unit	Retail price	Marketing Margin		Farm Value [1] [2]	
		Absolute	Percentage of retail value	Absolute	Percentage of retail value
	Cents	*Cents*	*Percent*	*Cents*	*Percent*
Carrots (Pound)					
November 1979	32.0	21.8	68	10.2	32
October 1979	32.5	21.8	67	10.7	33
November 1978	32.0	23.4	73	8.6	27
Celery (Pound)					
November 1979	25.5	18.9	74	6.6	26
October 1979	23.1	17.4	75	5.7	25
November 1978	37.0	25.4	69	11.6	31
Lettuce (Head)					
November 1979	69.0	56.0	81	13.0	19
October 1979	74.0	59.7	81	14.3	19
November 1978	64.0	47.4	74	16.8	26
Onions, Dry Yellow (Pound)					
November 1979	24.0	18.7	78	5.3	22
October 1979	26.0	20.7	80	5.3	20
November 1978	27.0	21.5	80	5.5	20
Potatoes, round white (Pound)					
November 1979	14.8	11.3	76	3.5	24
October 1979	15.8	12.0	76	3.8	24
November 1978	16.8	12.1	72	4.7	28
Potatoes, Russet (Pound)					
November 1979	23.8	17.0	71	6.8	29
October 1979	21.8	15.0	69	6.8	31
November 1978	23.8	18.5	78	5.3	22
Sweetpotatoes (Pound)					
November 1979	29.0	16.8	55	12.2	42
October 1979	34.0	23.1	68	10.9	32
November 1978	29.0	14.6	50	14.4	50

[1] For quantity of product equivalent to retail unit sold to consumers: Because of waste and spoilage during marketing, equivalent quantity exceeds retail unit. [2] Production areas: Carrots-California; Celery-California; Lettuce-California; Onions-New York; Potatoes, round white-New York; Potatoes, Russet-Idaho; and Sweetpotatoes-North Carolina.

Table 11—Fresh vegetables: 1979 representative truck rates for selected items[1]

Commodity, area, and city	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars per package											
Cabbage (wirebound crate)												
Southern Florida to:												
Atlanta	N/A	N/A	N/A	.49	N/A	---	---	---	---	---	N/A	N/A
Chicago	2.00	2.00	2.00	2.00	2.18	---	---	---	---	---	2.15	2.15
New York City	1.90	1.90	1.90	1.90	2.08	---	---	---	---	---	2.05	2.05
Rio Grande Valley, Texas to:												
Chicago	2.00	2.00	2.00	2.22	2.30	2.30	---	---	---	---	---	1.90
Dallas	.90	.90	.90	.90	.90	.90	---	---	---	---	---	1.10
New York City	2.89	2.89	2.89	3.20	3.35	3.35	---	---	---	---	---	N/A
Carrots (48/1 # film)												
California points to:[2]												
Chicago	2.30	2.30	2.30	2.61	2.71	3.14	3.21	3.21	2.78	2.85	2.64	2.69
New York City	3.07	3.07	3.07	3.69	3.28	4.14	4.71	4.43	3.71	3.85	3.64	3.62
Los Angeles	.50	.50	.50	.50	.75	.75	.75	.87	.95	1.01	1.09	.71
Seattle	1.38	1.38	1.38	1.69	1.57	1.71	1.57	N/A	N/A	N/A	N/A	N/A
Rio Grande Valley, Texas to:												
Chicago	1.79	1.79	1.79	2.00	2.05	2.05	---	---	---	---	---	---
New York City	2.73	2.73	2.73	3.02	3.15	3.15	---	---	---	---	---	---
Washington, D.C.	2.41	2.41	2.41	2.68	2.80	2.80	---	---	---	---	---	---
Celery (wirebound crate)												
Southern California to:												
Chicago	2.50	2.50	2.50	2.70	3.40	3.40	4.16	---	---	---	---	2.67
New York City	3.30	3.25	3.20	3.95	4.30	4.35	5.42	---	---	---	---	3.83
Los Angeles	.50	.50	.50	.50	.60	.60	.60	---	---	---	---	N/A
Seattle	1.40	1.40	1.40	1.60	2.00	2.00	N/A	---	---	---	---	N/A
Salinas-Watsonville, Calif. to:												
Chicago	---	---	---	---	3.17	3.67	3.75	3.75	3.25	3.33	3.08	---
New York City	---	---	---	---	3.83	4.83	5.50	5.17	4.33	4.50	---	
Los Angeles	---	---	---	---	1.02	1.02	1.02	1.02	1.11	1.18	1.18	---
Seattle	---	---	---	---	1.83	2.00	1.83	N/A	N/A	N/A	N/A	---
Southern Florida to:												
Atlanta	1.38	N/A	1.50	1.50	1.80	1.80	---	---	---	---	---	---
Detroit	1.80	2.00	2.00	2.15	2.15	2.18	---	---	---	---	---	---
Dallas	1.68	1.50	1.68	1.75	2.02	---	---	---	---	---	---	---
New York City	1.90	1.90	1.90	2.05	2.05	2.05	---	---	---	---	---	---
Washington, D.C.	1.80	1.80	1.80	1.95	1.95	1.95	---	---	---	---	---	---
Corn (wirebound crate)												
Southern Florida to:												
Boston	1.67	1.67	1.68	1.82	1.82	1.82	---	---	---	---	---	---
Chicago	1.68	1.70	1.68	1.82	1.82	1.82	---	---	---	---	---	---
New York City	1.57	1.58	1.58	1.75	1.75	1.72	---	---	---	---	---	---
Washington, D.C.	1.47	1.48	1.48	1.65	1.65	1.65	---	---	---	---	---	---
Cucumbers (1-1/9 bu. crate)												
Southern Florida to:												
Chicago	2.00	2.00	2.00	2.10	2.17	2.08	---	---	---	---	---	2.15
New York City	1.80	1.80	1.80	1.90	2.07	2.10	---	---	---	---	---	2.05
Nogales, Ariz. (Mexican imports) to:												
Chicago	2.49	2.49	2.27	2.70	2.92	---	---	---	---	---	---	---
New York City	3.14	3.14	3.00	3.65	4.02	---	---	---	---	---	---	---
Lettuce (24-head ctn.),												
California points to:[2]												
Atlanta	2.00	2.00	2.00	2.25	2.25	2.88	3.16	3.12	2.62	2.69	2.38	1.88
Chicago	1.87	1.87	1.87	2.13	2.38	2.75	2.81	2.81	2.44	2.50	2.31	2.18
Dallas	1.50	1.50	1.50	1.38	1.75	2.13	2.25	2.38	2.06	2.44	2.22	1.37
Los Angelesd	.40	.40	.40	.40	.76	.76	.84	.76	.84	.88	.89	.58
New York City	2.50	2.50	2.50	3.00	2.88	3.63	4.12	3.88	3.25	3.38	3.19	2.93
Onions, dry (50-lb. sack)												
Western Michigan to:												
Chicago	.45	.45	.45	.45	---	---	---	---	.47	.47	.44	.44
Western & Central New York to:												
Boston	.75	.75	.75	.75	.75	---	---	---	N/A	N/A	N/A	N/A
New York City	.65	.65	.65	.65	.70	---	---	---	.65	.65	.65	.65

See footnotes at end of table.

Table 11—Fresh Vegetables: 1979 representative truck rate for selected items[1]—Continued

Commodity, area and city	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dollars per package											
Onions, dry (50 lb. sack)												
Rio Grande Valley, Texas to:												
Atlanta	---	1.20	1.20	1.40	1.40	1.40	1.30	1.30	---	---	---	---
Boston	---	2.40	2.40	2.72	2.90	2.90	n.a.	n.a.	---	---	---	---
Chicago	---	1.45	1.45	1.65	1.70	1.70			---	---	---	---
Dallas	---	.80	.80	.80	.80.	.80			---	---	---	---
New York City	---	2.05	2.05	2.32	2.45	2.45	2.45	2.45	---	---	---	---
Stockton, California to:												
Boston	---	---	---	---	---	n.a.	n.a.	n.a.	---	---	---	---
Chicago	---	---	---	---	---	2.29	3.88	3.09	---	---	---	---
New York City	---	---	---	---	---	3.40	5.76	4.58	---	---	---	---
Peppers, Green (1-1/9 bu. crate)												
Southern Florida to:												
Chicago	1.45	1.45	1.45	1.45	1.50	1.40	---	---	---	---	---	---
New York City	1.35	1.35	1.35	1.35	1.40	1.40	---	---	---	---	---	---
Nogales, Arizona (Mexican Imports)to:												
Chicago	1.69	1.69	1.54	1.84	---	---	---	---	---	---	---	---
New York City	2.13	2.13	2.03	2.48	---	---	---	---	---	---	---	---
Potatoes (100-lb. sack)												
Idaho Falls, Idaho to:												
Atlanta	3.75	3.75	3.75	3.75	3.88	4.12	---	---	---	4.17	4.17	4.28
Chicago	2.90	2.90	3.00	3.12	3.12	3.30	---	---	---	3.50	3.50	3.50
Los Angeles	1.50	1.50	1.55	1.55	1.55	1.55	---	---	---	n.a.	n.a.	n.a.
New York City	4.75	4.75	4.88	4.88	4.88	5.12	---	---	---	5.12	4.88	5.12
Presque Isle, Maine to:												
Boston	1.10	1.10	1.10	1.10	1.20	1.20	---	---	---	n.a.	n.a.	n.a.
New York City	1.70	1.70	1.70	1.70	1.80	1.80	---	---	---	1.90	1.91	1.99
Red River Valley (Minn.-N.D.) to:												
Chicago	1.75	1.75	1.75	1.75	---	---	---	---	1.39	1.61	1.92	1.94
Detroit	2.30	2.30	2.30	2.30	---	---	---	---	n.a.	n.a.	n.a.	n.a.
Long Island, New York to:												
Atlanta	1.35	1.35	1.35	---	---	---	---	---	---	---	1.70	1.68
Boston	1.00	1.00	1.00	---	---	---	---	---	1.40	1.30	n.a.	n.a.
New York City	.55	.55	.55	---	---	---	---	---	.73	.73	.67	.67
Western & Central New York to:												
Atlanta	2.20	2.20	2.25	2.25	2.25	---	---	---	n.a.	n.a.	n.a.	n.a.
Boston	1.50	1.50	1.50	1.50	1.50	---	---	---	n.a.	n.a.	n.a.	n.a.
New York City	1.30	1.30	1.40	1.40	1.40	---	---	---	n.a.	n.a.	n.a.	n.a.
Southern Oregon to:												
Los Angeles	1.43	1.43	1.35	1.30	---	---	---	---	---	---	1.72	1.78
Yakima, Washington to:												
Atlanta	n.a.	n.a.	4.34	4.50	4.25	---	---	---	4.86	4.99	4.99	4.99
Chicago	n.a.	n.a.	3.62	3.75	3.88	---	---	---	3.94	3.98	3.73	4.04
New York City	n.a.	n.a.	5.38	5.38	5.35	---	---	---	6.17	6.30	6.43	6.43
Los Angeles	n.a.	n.a.	1.55	1.55	1.75	---	---	---	2.24	2.33	2.36	2.47
Madison, Wisconsin to:												
Atlanta	2.00	2.00	2.00	2.00	---	---	---	---	2.32	2.43	2.43	2.32
Sweet Potatoes (50-lb. crate)												
Southwest Louisiana to:												
Chicago	1.10	1.10	1.10	1.10	---	---	---	n.a.	n.a.	n.a.	n.a.	n.a.
New York City	1.35	1.35	1.35	1.35	---	---	---	n.a.	n.a.	n.a.	n.a.	n.a.
Raleigh, North Carolina to:												
Atlanta	.68	.68	.68	.68	---	---	---	---	.75	.78	.78	.68
Chicago	.95	.95	.95	.95	---	---	---	---	1.12	1.12	1.12	1.12
New York City	.80	.80	.80	.80	---	---	---	---	.98	1.05	1.05	1.00
Tomatoes, Green (30-lb. ctn.)												
Southern Florida to:												
Atlanta	.70	n.a.	.65	.65	.75	---	---	---	---	---	---	---
Chicago	1.20	1.20	1.20	1.40	1.40	---	---	---	---	---	---	---
New York City	1.18	1.18	1.18	1.18	1.40	---	---	---	---	---	---	---

[1] Reported from a sample of shippers and/or truck brokers in specified areas for shipments during the first week of the month. [2] Imperial Valley: Jan.-Apr., Dec., Salinas-Watsonville: May-Nov.

Table 12—Potatoes, Irish: Acreage, yield per acre, and production, 1977, 1978, and 1979

Seasonal group	Harvested acreage			Yield per acre			Production		
	1977	1978	1979[1]	1977	1978	1979[1]	1977	1978	1979[1]
	1,000 acres			*Cwt.*			*1,000 cwt.*		
Winter	13.4	12.9	11.9	199	203	200	2,660	2,621	2,383
Spring	91.4	90.9	83.8	250	198	255	22,870	17,963	21,345
Summer	115.2	111.9	109.0	191	189	205	21,982	21,167	22,292
Fall									
7 Eastern	197.9	201.7	194.2	252	234	257	49,836	47,403	49,854
8 Central	322.3	316.2	294.4	210	219	212	67,772	69,276	62,326
9 Western	618.5	637.0	585.6	306	325	324	189,456	206,930	189,448
Total, Fall	1,138.7	1,155.4	1,074.2	270	280	281	307,064	323,498	301,628
United States	1,358.7	1,370.8	1,278.9	261	266	272	354,576	365,249	347,648

[1] Preliminary.

Source Crop Production, annual CRB, ESCS.

Table 13—Sweetpotatoes: Acreage, yield per acre, and production, 1977, 1978, and 1979

Group and State	Harvested acreage			Yield per acre			Production		
	1977	1978	1979[1]	1977	1978	1979[1]	1977	1978	1979[1]
	1,000 acres			*Cwt.*			*1,000 cwt.*		
Central Atlantic[2]	9.6	10.1	10.0	125	135	130	1,200	1,364	1,295
Lower Atlantic[3]	40.8	45.4	49.8	126	134	118	5,159	6,092	5,890
Central[4]	54.2	54.4	56.3	90	97	101	4,866	5,453	5,668
California	7.8	8.7	9.5	150	160	165	1,170	1,392	1,568
United States	112.4	120.6	125.6	110	119	115	12,395	14,301	14,421

[1] Preliminary. [2] New Jersey, Maryland, and Virginia. [3] North Carolina, South Carolina and Georgia. [4] Tennessee, Alabama, Mississippi, Arkansas, Louisiana and Texas.

Croo Production, annual summary, ESCS, USDA.

Table 14—Potatoes: Prices f.o.b. shipping points per hundredweight, U.S. No. 1 grade or better, indicated periods, 1978, 1979, and 1980

Shipping point and variety	1978-79			1979-80		
	November 11	December 9	January 13	November 10	December 8	January 12
	Dollars					
Maine						
Round whites	3.36	3.16	3.82	3.28	2.96	2.92
Long Island, New York						
Round whites	4.50	4.50	5.38	4.36	4.38	4.36
New York, Upstate						
Round whites	---	---	---	---	---	---
Michigan						
Round whites	4.10	4.08	4.50	4.20	4.38	4.38
Wisconsin						
Round whites	6.00	6.00	6.50	6.00	6.50	6.50
Washington						
Russets	---	---	---	---	---	---
Colorado						
Reds	4.75	4.50	4.63	5.63	5.75	5.75
Idaho						
Russets 2" or 4 oz. min.	8.88	8.60	9.25	11.50	11.38	10.00

F.O.B. prices are simple averages of the range of daily prices for the week ended on indicated date.

Compiled from Market News Service reports.

Table 15—Canned vegetables: Commercial pack and canners' seasonal supply, shipments and to January 1, seasonal shipments, selected commodities

Commodity and season	Carryover	Pack	Seasonal supply	Shipments to January 1	Stocks January 1	Total seasonal shipments
	Mil. cases 24/303's					
Beans, lima						
1976-77	1.0	2.8	3.8	1.3	2.4	3.1
1977-78	.7	2.7	3.4	1.6	1.7	3.1
1978-79	.3	3.4	3.7	1.9	2.1	3.1
1979-80	.5	3.1	n.a.	n.a.	n.a.	n.a.
Beans, snap						
1976-77	13.6	47.4	61.0	30.5	30.5	55.3
1977-78	5.7	54.5	60.2	30.5	29.7	55.2
1978-79	5.0	57.1	62.1	32.3	29.4	55.8
1979-80	6.2	65.2	n.a.	42.1	n.a.	n.a.
Corn, sweet						
1976-77	9.7	54.7	64.4	25.6	38.8	54.7
1977-78	9.7	56.3	66.0	28.6	37.4	58.4
1978-79	7.6	57.9	65.5	32.4	37.7	57.9
1979-80	1.0	60.0	n.a.	32.1	n.a.	n.a.
Peas, green						
1976-77	8.4	31.9	40.3	18.6	21.7	32.6
1977-78	7.7	30.2	37.9	20.1	17.8	33.5
1978-79	4.4	25.3	29.7	11.8	11.0	25.3
1979-80	1.6	36.5	n.a.	27.1	n.a.	n.a.

N.A.—Not available.

Source National Food Processors Association.

Table 16—Sweetpotatoes: Prices f.o.b. shipping points and wholesale price at New York and Chicago, indicated periods, 1978, 1979, and 1980

Item	State	Week ended					
		1978-79			1979-80		
		Nov. 18	Dec. 9	Jan. 13	Nov. 17	Dec. 8	Jan. 12
		Dollars					
F.o.b. shipping points:							
Porto Rico, cured (50 lb. ctn. & crt., U.S. No. 1).	S.W. Louisiana	7.63	7.63	7.63	6.00	7.13	7.00
Jewels (50 lb. ctn. & crt., U.S. No. 1).	Eastern N. Carolina	6.50	6.50	6.50	7.00	6.75	6.50
		Tuesday nearest mid-month					
		1978-79			1979-80		
		Nov. 14	Dec. 12	Jan. 16	Nov. 13	Dec. 11	Jan. 15
		Dollars					
Terminal markets:							
New York							
Porto Rico cured (50-lb. ctn.). . .	N. Carolina	7.25	7.25	—	8.75	7.75	8.50
Chicago							
Porto Rico cured (50-lb. crt.) . . .	Louisiana	8.24	9.00	—	8.37	9.00	9.00

F.o.b. prices are simple averages of the range of daily prices, compiled from Market News Service reports. The market prices are representative prices for Tuesday of each week and are submitted by the Market News Service representative at each market.

Table 17—United States average prices received by farmers per hundredweight for important field crops, indicated periods 1978 and 1979

Commodity	1978	1979			
	Dec. 15	Jan. 15	Oct. 15	Nov. 15	Dec. 15
	Dollars				
Potatoes	3.12	3.13	3.17	3.37	3.40
Sweetpotatoes	11.30	12.00	6.43	7.66	8.33
Beans, dry edible . . .	16.90	16.50	20.40	20.80	23.00
Peas, dry	8.31	8.48	9.86	9.45	9.51

Source: Agricultural Prices, CRB, ESCS.

Table 18—Beans, dry edible: Acreage, yield per acre, and production, 1977, 1978, and 1979[1]

States and Classes	Harvested acreage			Yield per acre			Production[2]		
	1977	1978	1979	1977	1978	1979	1977	1978	1979
	1,000 acres			*Pounds*			*1,000 cwt.*		
Michigan	480.0	540.0	490.0	1,180	1,150	1,400	5,664	6,210	6,860
New York	32.0	42.0	40.0	1,100	1,019	1,200	352	428	480
Northwest[3]	429.5	489.4	483.7	1,455	1,498	1,656	6,248	7,333	8,010
Southwest[4]	163.5	194.0	200.0	862	900	898	1,409	1,746	1,795
California									
Large lima	31.0	29.0	27.0	1,740	1,579	1,926	540	458	520
Baby lima	22.0	25.0	29.0	2,160	2,048	2,241	475	512	650
Other	116.0	162.0	149.0	1,610	1,452	1,577	1,872	2,353	2,350
Total California	169.0	216.0	205.0	1,708	1,538	1,717	2,887	3,323	3,520
Other States	5.9	([5])	([5])	848	([5])	([5])	50	([5])	([5])
United States	1,279.9	1,481.4	1,418.7	1,298	1,285	1,457	16,610	19,040	20,665

[1] Includes beans grown for seed. [2] Cleaned basis. [3] Nebraska, Montana, Idaho, Wyoming, Washington, Minnesota, and North Dakota. [4] Kansas, Colorado, and Utah. [5] Discontinued after 1977.

Source Crop Production, Annual CRB, ESCS.

Table 19—Beans, dry edible: Production in selected States, by major types, United States, 1979, and total by types 1978

Type	Michigan	Idaho	Wyoming	Nebraska	Washington	Colorado	New York	California	Other[1]	Total	
										1979[2]	1978
	1,000 cwt.										
Peas, navy	5,165	---	---	---	---	---	---	---	630	6,418	5,795
Great northern	---	513	64	1,280	---	---	---	---	6	1,998	1,863
Pinto	92	1,138	363	652	248	1,526	---	---	1,509	5,940	5,528
Red kidney	424	101	---	---	---	---	315	1,003	---	1,637	1,843
Small red	---	213	---	---	146	---	---	---	---	468	359
Large lima	---	---	---	---	---	---	---	458	---	520	458
Baby lima	---	---	---	---	---	---	---	512	---	650	512
Small white[3]	---	---	---	---	45	---	---	145	---	177	190
Blackeye	---	---	---	---	---	---	---	778	---	930	778
Other	529	529	---	15	65	4	113	427	81	1,658	1,763
U.S. total	6,210	2,494	427	1,947	504	1,530	428	3,323	2,226	20,396	19,089

[1] Includes Illinois, Indiana, Kansas, Minnesota, Montana, New Mexico, North Dakota, and Utah. [2] Preliminary. [3] Includes flat small white.

Crop Production, annual summary, ESCS, USDA.

Table 20—Peas, dry field: Acreage, yield per acre, and production 1977, 1978, and 1979[1]

State	Harvested acreage			Yield per acre			Production		
	1977	1978	1979	1977	1978	1979	1977	1978	1979
	1,000 acres			*Pounds*			*1,000 cwt.*		
Idaho	67	82	51	840	1,830	1,380	563	1,501	704
Washington	100	120	85	460	1,750	1,570	460	2,100	1,335
United States	167	202	136	613	1,783	1,499	1,023	3,601	2,039

[1] Includes peas grown for seed and cannery peas harvested dry.

Source: Crop Production, Annual CRB, ESCS.

LIST OF TABLES

Table	Title	Page
1	Potatoes: January 1 total stocks, by areas, United States	11
2	U.S. exports of dried edible beans by country destination	14
3	Beans, dry edible: Production by commercial classes, 1974-79	15
4	Vegetables and melons for fresh market: Commercial acreage, production, and value for principal crops, 1977, 1978, and 1979	16
5	Vegetables, fresh: Representative wholesale prices (wholesale lot) sales at New York and Chicago for stocks of generally good quality and condition (U.S. No. 1 when available) indicated periods, 1978, 1979, and January 1980	17
6	Vegetables, fresh: Average f.o.b. shipping point prices per hundredweight, United States, indicated periods, 1978 and 1979	18
7	Vegetables, commercial for fresh market: Index numbers (unadjusted) of prices received by farmers, as of the 15th of the month, United States, by months	18
8	Vegetables for commercial processing: Acreage, production, and season average price per ton, 1977, 1978, and 1979	19
9	Vegetables, frozen: Cold storage holdings and indicated disappearance, Sept. 1 to Dec. 31	20
10	Fresh Vegetables: Retail price, marketing margin, and farm value per unit, sold in New York City, indicated months, 1978 and 1979	21
11	Fresh Vegetables: 1979 representative truck rates for selected items	22
12	Potatoes, Irish: Acreage, yield per acre, and production, 1977, 1978, and 1979	24
13	Sweetpotatoes: Acreage, yield per acre, and production, 1977, 1978, and 1979	24
14	Potatoes: Prices f.o.b. shipping points, per hundredweight, U.S. No. 1 grade or better, indicated periods, 1978, 1979, and 1980	25
15	Canned vegetables: Commercial pack and canners' seasonal supply, shipments to January 1, stocks January 1, and total seasonal shipments, selected commodities	25
16	Sweetpotatoes: Price f.o.b. shipping points and wholesale price at New York and Chicago, indicated periods, 1978, 1979, and 1980	26
17	United States average prices received by farmers per hundredweight for important field crops, indicated periods, 1978, 1979, and 1980	26
18	Beans, dry edible: Acreage, yield per acre, and production, 1977, 1978, and 1979	27
19	Beans, dry edible: Production in selected States, by major types, United States, 1979 and total by types 1978	27
20	Peas, dry field: Acreage, yield per acre, and production, 1977, 1978, and 1979	27

STATUS OF HARVEST MECHANIZATION OF VEGETABLE CROPS IN THE UNITED STATES

By Stanley S. Johnson and Mike Zahara*

ABSTRACT: This study examines the current status of harvest mechanization of the major vegetable crops in the United States. Mechanization has progressed further with vegetable crops for processing (58 percent) than with vegetables for fresh market (26 percent). The substitution of machines for hand labor is indicated by labor-displacement ratios ranging from 1:1 to 100:1 for vegetables. A set of predictions of mechanization made in 1968 was generally correct for processing vegetables but was over optimistic for vegetables for the fresh market. The rates of inventive activity and adoption are responsive to many factors, a large proportion of which eventually are economic. However, inventive success ratios may decrease, since mechanization has already been developed for the crops that are most easily mechanized and have the highest per acre values, slighting the problems with less chance of payoff and the lower-valued crops.

KEYWORDS: Vegetables, harvest mechanization, labor displacement, adoption rate.

Harvest mechanization, now largely accomplished for large-acreage crops, is turning to crops with smaller national acreages, primarily fruits and vegetables. Nationally, fruits and vegetables range in area from about 800,000 acres for oranges to about 5,500 acres for brussel sprouts. Although vegetable crops occupy only 1 percent of the total crop acreage, they involve 12 percent of the total crop value *15*.

The status of, and outlook for vegetable harvest mechanization was summarized in 1968 in a landmark symposium of leading horticulturists, engineers, and others *1*. Since then, little comprehensive information has been published on progress in the adoption of new machines. This article provides an estimate of the mechanical harvest of the major U.S. vegetable crops, describes harvest mechanization changes in the last 10 years, and examines the accuracy of 1968 predictions about likely levels of mechanization in 1975. This article also assesses problems in the development and adoption of new technology, and illustrates the patterns of diffusion of mechanical innovations for several crops.

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Materials and Methods

The extent of harvest mechanization of each crop was estimated from data obtained in a search of secondary sources, discussions with knowledgeable horticulturists, and research by the authors. Those sources also were used to get man-machine substitution rates.

Results and Discussion

A relationship exists between the use of a crop and the extent of mechanization (table 1). Vegetables are classified according to use into processed and fresh categories. Fifteen of the 19 vegetables listed are used for processing, ranging from 99 percent of the total crop of peas to 20 percent of the sweet potatoes. Of these 15, 12 are mechanically harvested, ranging from 100 percent of the crop to 1 percent.

Only eight of the vegetables listed for fresh use are machine harvested. The data show that harvest mechanization has been applied mostly to crops used for processing.

With crops for processing, harvest techniques that slightly damage the surface or even bruise the product are acceptable without significant penalty in the marketplace because the blemish or bruise can be cut out. In contrast, products that are marketed fresh must be attractive and be free of bruises, especially since the time between picking and utilization may be relatively long. Relatively few fresh-market crops are machine harvested because it is difficult to develop machinery that does not injure the product.

Total value, acreage, and tonnage provide a perspective on the importance of the crops listed in table 1. Schmookler suggested that the higher value crops will have more inventive activity, since the profit potential is greater *9*. The relationship between the vegetable crop value and mechanization can be seen in tables 1 and 2.

Positive correlation between crop value and mechanization is strongest for the vegetables for processing. The highest value vegetable crops are potatoes and tomatoes, with a combined value greater than for all the other vegetable crops listed. For potatoes, with significant proportions going for both fresh and processing, mechanical harvesting has been developed for both categories; for tomatoes, the harvest of the processing crop, which accounts for 90 percent of the total crop, has largely been mechanized, but the fresh crop is still essentially harvested by hand. Of considerably lower value are the next three crops—lettuce, onions, and sweet corn. This group is followed by snap beans, cucumbers, carrots, sweet potatoes, and cabbage. Of these medium-value crops, all those with a significant percentage going to processing are partially or mostly mechanized. The remaining crops, again, are considerably less important in value. Of the lower-valued, crops only green lima beans and peas are harvested mechanically. Since 1975 some progress has occurred in machine harvesting of brussel sprouts, broccoli, celery, and fresh onions.

For the fresh market crops, there is little positive correlation between value and mechanization. Of the 19 fresh vegetables considered, 7 of the high value crops had some mechanization, while there was none for the 8 low value crops.

Man-machine ratios (last column table 1) indicate the labor savings through machine adoption. The ratios represent the following: Number of hours of labor required in previous technology (whether it involved hand or machine-aided harvest) to number of hours required in new technology.

The man-machine ratios range from 5:1 to 100:1 for mechanically harvested vegetables. Most vegetable crops are less difficult to mechanize than fruit crops and in some cases the rate of labor displacement has been high. For instance, a hand-operated pea shelling device replaced 100 to 200 hand shellers; later, the stationary viner replaced the hand-operated shelling device at a ratio of 100:1 *4*. Another example of a significant, though less labor-replacing innovation, is the harvest of carrots. Hand harvest of carrots was succeeded by a mechanical harvester which allowed 6 workers to replace 100 workers, a ratio of 17:1. Man-machine ratios are increased through improvements of mechanical harvesters, combined with learning-by-doing and other factors. For example, the man-machine ratio for the tomato (for processing) harvester, initially 3:1, was gradually increased to 7:1. Adding electronic sorting capabilities to the machine changed the rato to 20:1 over hand-harvest technology *12*, *20*. However, harvest labor requirements can be reduced by innovations other than machines. For example, incentives for workers can help. Changing the hand harvest of lettuce from an hourly rate of pay to a piece rate has incresed productivity 3.6:1 over the years. One initial model of a mechanical lettuce harvester could further increase this ratio by only 1.2:1 *19*.

Since the 1968 summary of harvest mechanization for fruits and vegetables *2*, changes have been significant although relatively few in number (table 2). The major changes have involved a continuing diffusion of machine-harvest technology among crops. That diffusion, however, has been less swift and apparently less pervasive than many people had anticipated in 1968. At that time there was great optimism that the rapid development and adoption of machines would continue much as it had for potatoes and, especially, for processing tomatoes. In fact, the predictions were roughly correct for processed vegetables. It was in the fresh vegetables and all fruit categories where the expectations were not borne out.

Predicting technological change involves an assessment of an extremely complicated social process. The process must be assessed in two stages: the inventive (product development) and the diffusion (adoption) stages. Success in invention and development of new technology for one crop, followed by rapid diffusion of the innovation for that crop, may have little correlation with the development or spread of technology in another similar crop. To compound the problem, almost every vegetable crop is unique. Inventive and developmental activity is responsive to economic incentives *9*. In the future, inventive success for vegetable crop mechanization may be lower than in the past, because the crops that are still harvested by hand pose more difficult engineering and horticultural problems. With crops for fresh market, the difficult technical problem is

to design a machine that can match hand-harvest in minimal physical damage to the product. Many machines invented to harvest crops for the fresh market have not been commercially developed or adopted because of faults in design, inefficient performance, poor man-machine ratios, inability to perform in wet conditions, and other shortcomings. Modification of horticultural techniques can facilitate mechanization; examples are the development of adequate abscission chemicals to permit easy removal of fruit from trees or vines and of cultivars resistant to rough treatment. Meanwhile, economic, societal, and political changes have affected the availability, control and wages of farm workers—factors which greatly affect growers' assessment of their need for machines.

The diffusion (adoption) process is responsive also to profit expectations *5*. The speed of the process also is affected by other factors, such as the dissemination of information about the innovation, the growers' familiarity with the technique or product, and the education and skill levels of the potential adopters. There is little incentive to adopt a harvest machine if the cost of hand and machine harvest are fairly close, if the supply of labor is adequate, or if the management of labor is not too difficult.

Figure 1 contrasts the pattern of diffusion of mechanical harvesting of cotton, a major U.S. field crop, with that of some fruit and vegetable crops. The cumulative diffusion portrayed shows that the complete cycle of adoption for this large crop from 0 to 100 percent adoption was S-shaped (sigmoid). Early adoption was slow followed by rapid adoption by the majority of growers which tapered off as diffusion neared completion. This S-shaped diffusion pattern has been noted by others for large crops, espcially Grilches' study of the adoption of hybrid corn *5*. For small-acreage crops, however, the pattern is not as obvious from observation of the data. The diffusion cycle for potatoes resembles an S shape. However, the processed tomato and tart cherry cycles indicate such a rapid adoption as to be almost straight line, although they do taper off as the cycle nears completion. The remaining crops, peaches and wine grapes, exhibit what might be the start of a sigmoid curve; however, it is too early in time yet to tell. At this time, although large acreage field crops have followed an S-shaped diffusion cycle, we can generalize by including fruits and vegetables only to a limited extent. The small acreage and number of growers may preclude the typical shaped adoption curve.

The pace of future technological change for vegetable harvesting will depend on a number of factors, especially on the direction of research. The change in scope of mechanication from large to small-acreage crops can focus more research attention on vegetable crops. One implication of this change in focus is that it may not be economically feasible for large manufacturers to undertake the development of this technology—or even to fabricate machines from existing designs—if the market is small. Future development of mechanical harvesters for small acreage crops likely will have to rely largely on the research of public institutions, small machinery companies, individual growers and machine shops.

FIG. 1 MACHINE HARVESTING DIFFUSION PATTERNS, VARIOUS CROPS

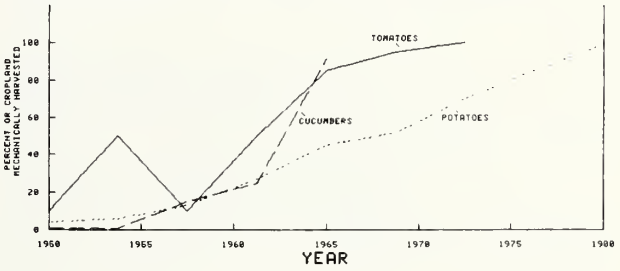

Table 1. Vegetable Crops: Use, Value and Acreage, Extent of Mechanical Harvest, and Man-Machine Ratios for the U.S., 1975

Crop	Use of Crop[1]		Total value[1] $1,000.000 and (Rank)	Acreage[1] 1,000 acres	Crop mechanically harvested[2]		Man-machine ratio
	Processed %	Fresh %			%	%	
Artichoke	0	100	12 (19)	10	0	0	0[3]
Asparagus	60	40	61 (14)	101	1	1	4
Beans							
Green Lima	90	10	31 (17)	77	100	0	100:1[1]
Snap	81	19	163 (6)	353	100	50	50:1[5]
Broccoli	52	48	56 (15)	47	0	0	0[3]
Brussels Sprouts	70	30	12 (18)	5	0	0	0[3]
Cabbage	81	19	118 (12)	104	80	0	9:1[8]
Cantaloupe	0	100	101 (13)	49	0	0	0[3]
Carrot	34	66	133 (8)	69	100	99	17:1[6]
Cauliflower	36	64	46 (16)	32	0	0	0[3]
Celery	0	100	17 (11)	32	1	15	1:1[5]
Corn, Sweet	77	23	245 (5)	677	100	30	10:1[7]
Cucumber	74	26	135 (7)	188	30	0	9:1[8]
Lettuce	0	100	359 (3)	227	0	0	0[3]
Onions	38	62	280 (4)	131	100	16	15:1[9]
Peas	99	1	60 (9)	435	100	0	100:1[5]
Potatoes	56	44	1,520 (1)	1,258	100	99	10:1[9]
Sweet Potato	20	80	125 (10)	119	75	25	10:1[10]
Tomato	90	10	905 (2)	504	95	0	7:1[11]

[1] Source: (13) [2] Data derived from secondary sources and discussions with knowledgeable horticulturists and engineers. [3] No mechanization. [4] No information. [5] Source: (3) [6] Source: (1) [7] Source: (2) [8] Source: (10) [9] Source: (16) [10] Source: (17) [11] Source: (11, 18)

Table 2. The percentage of vegetables machine harvested: actual 1968, prediction 1968 for 1975, and actual 1978

	Percentage machine harvested				Percentage machine harvested		
	Actual 1968	Predicted 1975	Actual 1978		Actual 1968	Predicted 1975	Actual 1978
Vegetables							
Processing				Fresh			
Beans, snap	100	100	100	Beans, snap	30	100	50
Cabbage	2	50	80	Cabbage	0	0	0
Carrots	95	100	100	Carrots	95	100	99
Corn, sweet	100	100	100	Corn, sweet	30	75	30
Cucumbers	15	55	.30	Cucumbers	0	0	0
Onions	30	70	100	Lettuce	0	50	0
Peas, green	99	100	100	Onions	-Y	-Y	0
Potatoes	85	97	100	Peas, green	-Y	-Y	0
Sweet potatoes	70	90	75	Potatoes	85	97	99
Tomatoes	65	90	95	Sweet potatoes	-Y	-Y	25
				Tomatoes	0	30	0

z Source: (1) and Table 1. y No Information

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